The EDISON ELECTRIC INSTITUTE BULLETIN

December 1957

PUBLIC LIBRARY
JAN
DETROIT

TECHNOLOGY DEPT.

V.25
#12

Published Monthly by
Edison Electric
Institute

J.W. McAfee New EEI President

Electric Industry in 1957 and Later

J. W. McAfee

What Can We Do About Government Spending?

Fred Rogers Fairchild

A Look into the Electrical Future

Walter T. Lucking

Fatal Accidents in the Industry

S. H. Young

ELECTRICAL RESEARCH STATISTICS
THE ELECTRIC LIGHT AND POWER INDUSTRY

Current Statistical Data Covering 100 Per Cent of Industry

(Includes Investor-Owned Companies, Cooperatives, and Government-Owned Utilities)

September, 1956-1957

SOURCE AND DISPOSAL OF ENERGY—MONTH OF SEPTEMBER

	1957	1956	%
NET GENERATION* (Kwhrs in Thousands)			
By Fuel Burning Plants	42,290,954	39,809,991	+ 6.2
By Water Power Plants	9,282,263	8,958,637	+ 3.6
Total Generation	**51,573,217**	**48,768,628**	**+ 5.8**
ADD—Net Imports Over International Boundaries	207,463	442,600	−53.1
Less—Company Use	152,230	127,214	+19.7
Less—Energy Used by Producer	967,974	1,136,296	−14.8
Net Energy for Distribution	**50,660,476**	**47,947,718**	**+ 5.7**
Lost and Unaccounted for	3,111,371	3,079,325	+ 1.0
Sales to Ultimate Customers	**47,549,105**	**44,868,393**	**+ 6.0**

CLASSIFICATION OF SALES

NUMBER OF CUSTOMERS—As of September 30th			
Residential or Domestic	46,606,256	45,389,036	+ 2.7
Rural (Distinct Rural Rates)	1,641,599	1,688,523	− 2.8
Commercial or Industrial:			
Small Light and Power	6,207,627	6,140,466	+ 1.1
Large Light and Power	312,105	298,897	+ 4.4
Other Customers	181,083	173,992	+ 4.1
Total Ultimate Customers	**54,948,670**	**53,690,914**	**+ 2.3**
KILOWATTHOUR SALES—During Month of September (Kwhrs in Thousands)			
Residential or Domestic	11,897,305	10,784,980	+10.3
Rural (Distinct Rural Rates)	1,188,941	1,200,444	− 1.0
Commercial or Industrial:			
Small Light and Power	8,679,743	7,950,516	+ 9.2
Large Light and Power	24,010,487	23,228,852	+ 3.4
Street and Highway Lighting	415,457	391,850	+ 6.0
Other Public Authorities	986,674	926,040	+ 6.5
Railways and Railroads:			
Street and Interurban Railways	168,256	180,691	− 6.9
Electrified Railroads	146,698	149,532	− 1.9
Interdepartmental	55,544	55,488	+ 0.1
Total to Ultimate Customers	**47,549,105**	**44,868,393**	**+ 6.0**
Revenue from Ultimate Customers (Thousands)	**$793,554**	**$742,652**	**+ 6.9**

RESIDENTIAL OR DOMESTIC SERVICE

AVERAGE CUSTOMER DATA—For 12 months ended September 30, 1957			
Kilowatthours per Customer	3,121	2,929	+ 6.6
Average Annual Bill	$80.21	$76.45	+ 4.9
Revenue per Kilowatthour	2.57¢	2.61¢	− 1.5

* By courtesy of the Federal Power Commission.

THE EDISON ELECTRIC INSTITUTE BULLETIN is published monthly by the Edison Electric Institute, an association of electric light and power companies in the United States and its territorial possessions. Its affiliate members consist of members of the Canadian Electrical Association.

The objectives of the Edison Electric Institute are:

The advancement in the public service of the art of producing, transmitting, and distributing electricity and the promotion of scientific research in such field.

The ascertainment and making available to the members and the public of factual information, data, and statistics relating to the electric industry.

To aid its operating company members to generate and sell electric energy at the lowest possible price commensurate with safe and adequate service, giving due regard to the interests of consumer, investor, and employee.

•

Closing date for the BULLETIN is the tenth of the month preceding the month of issue.

Manuscripts and correspondence relating to the BULLETIN should be addressed to the Editor, Edison Electric Institute, 420 Lexington Avenue, New York 17, N. Y.

The Edison Electric Institute does not assume responsibility for, nor necessarily endorse or approve, statements made by contributors to the BULLETIN.

•

Subscription price of the BULLETIN is $2.00 per year in the United States; $3.00 per year in foreign countries.

Entered as second-class matter, August 17, 1933, at the post office at Philadelphia 2, Pa., under the act of March 3, 1879. Publication office, 56th and Chestnut Sts., Philadelphia 39, Pa. Editorial office, 420 Lexington Ave., New York 17, N. Y. Volume 25, No. 12, 1957.

The EDISON ELECTRIC INSTITUTE BULLETIN

December, 1957

Vol. 25 No. 12

Articles, Speeches, Reports

J. W. McAfee Elected President of EEI; J. E. Corette Named Vice President 387

The Electric Industry in 1957 and Later
J. W. McAfee 389

What Can We Do About Government Spending?
Fred Rogers Fairchild 392

A Look into the Electrical Future
Walter T. Lucking 395

'Look Up and Live!', White Tells Construction Safety Meeting 399

How to Evaluate the Results of HOUSEPOWER Activities
Donald W. Runquist 401

Fatal Accidents in the Electric Light and Power Industry
S. H. Young 405

Electricity on the Modern Academic Scene
Ruth K. Stroh 410

News, Notes, Miscellany

EEI-AGA National Accounting Conference Plans Full Three-Day Program 388

50 Manufacturers Support National Electrical Week 388

Recent EEI Publications 409

Second Live Better Electrically Women's Conference Jan. 9-11 411

EEI Publications and Service Material 412

Personals 414

Conventions and Meetings 416

J. W. McAFEE

Newly Elected President of the Edison Electric Institute

J. W.
E
el
tric In
Directo
meetin
Coretta
Power
of the

Mr.
Presid
nedy,
Presid
tric C
Presid
Coretta
ties un

Mr.
and a
signed
double
lieved
demar
positi
chief
more
tireme
pany
tors
avoid
other

The
Mr. K
he ha
stand
tion
exem
devot
indus
of off

Mr
stitut
born
12, 19

J. W. McAfee Elected President of EEI; J. E. Corette Named Vice President

J. W. McAFEE, President of Union Electric Co., St. Louis, was elected President of Edison Electric Institute by the EEI Board of Directors at the December quarterly meeting. At the same time, J. E. Corette, President of The Montana Power Co., was elected Vice President of the Institute.

McAfee Succeeds Kennedy

Mr. McAfee, formerly EEI Vice President, succeeds Donald S. Kennedy, Chairman of the Board and President of Oklahoma Gas and Electric Co., Oklahoma City, as Institute President. Mr. McAfee and Mr. Corette will serve in their new capacities until June, 1958.

Mr. Kennedy, after serving a year and a half as Institute President, resigned because of the pressures of the double positions. In asking to be relieved of the post, he cited the heavy demands of both the trade association position and his duties as a company chief executive which have become more strenuous due to the recent retirement of key executives in his company organization. He said these factors made his action necessary, to avoid neglecting seriously one or the other responsibility.

The Institute Board, in accepting Mr. Kennedy's resignation, noted that he had served the industry with outstanding effectiveness since his election in June, 1956, and praised the exemplary degree of self-sacrifice and devotion to the welfare of the entire industry he displayed during his term of office.

Mr. McAfee, who was elected Institute Vice President in 1956, was born in Oklahoma City, Okla., Aug. 12, 1902, the son of Thomas and Anna Lee Lineberry McAfee. He grew up in Brookfield, Mo. He attended Lake Forest (Ill.) Academy and was graduated from the University of Missouri Law School in 1926. That same year he was admitted to the Missouri Bar and became a member of the law firm of Holland, Lashley & Donnell in St. Louis.

J. E. CORETTE
Newly elected EEI Vice President

Tax Counsel, Judge, Lawyer

From 1933 to 1935, Mr. McAfee served as a special tax counsel for the City of St. Louis. He was elected Judge of the Circuit Court in St. Louis in 1934 and served until 1937 when he resigned to re-enter private law practice with the firm of Igoe, Carroll, Keefe and McAfee. As a member of this firm he was engaged in legal work for Union Electric.

In 1941, at the age of 39, Mr. McAfee became president of Union Electric. From 1951 until 1955, when it was dissolved, Mr. McAfee also was president of the North American Co. of New York, the company which for many years owned the common stock of Union Electric. North American was dissolved in February, 1955, with all its 45,000 stockholders becoming the direct owners of the Union Electric Co.

Mr. McAfee also is a director and former president of Electric Energy, Inc., which was formed by Union Electric and four other companies in 1950 to build the 1,000,000-kilowatt power plant to supply half of the electricity for the atomic energy project near Paducah, Ky.

Two Coffin Awards

Union Electric, under Mr. McAfee's leadership, in 1948 won the Charles A. Coffin Award for the brilliant success of its highly conceived public relations program and in 1953 Electric Energy, Inc., won the Award for its long view in adapting itself to a new age and for establishing a utility organization that can and will take on public enterprise of great magnitude in the public interest without subsidization by the taxpayers of the nation.

As Vice President of EEI Mr. McAfee had been Chairman of the Institute's General Division Executive Committee since his election in June, 1956.

Active in the St. Louis business, civic and cultural life, he is on the governing boards of the St. Louis Council of the Boy Scouts of America, St. Louis Municipal Opera Association, of which he is now president, Washington University, Barnes Hospital, of which he is now chairman, and the Automobile Club of Missouri. He is a member of the American, Missouri,

and St. Louis Bar Associations. He is a director of General American Life Insurance Co., American Central Insurance Co., St. Joseph Lead Co., Anheuser Busch, and St. Louis Union Trust Co.

Corette Practiced Law

Mr. Corette is a native of Butte, Mont., and was educated at Montana State University and the University of Virginia, where he received his LL. B. degree in 1930. He was actively engaged in the practice of law throughout Montana from 1930 to 1944 and has been a partner in the law firm of Corette, Smith & Dean of Butte from 1934 to the present.

He was counsel for The Montana Power Co. from 1934 to 1944, when he was elected vice president and assistant general manager. He held that office until June, 1952, when he was elected president and general manager.

A director of Montana Power since 1948, he also is vice president and managing director of Canadian-Montana Pipe Line Co., and Canadian-Montana Gas Co., Ltd., subsidiaries of Montana Power. He is a director of the Federal Reserve Bank of Minneapolis, a director of the National Association of Electric Companies, a trustee of the Montana State University Endowment Foundation, and a past director of the National Association of Manufacturers.

Geneva UN Delegate

In October of this year he went to Geneva as United States delegate on the electric power committee of the United Nations Economic Commission for Europe.

Mr. Corette was Chairman of the Program Committee for the 25th Annual EEI Convention last June in Chicago.

EEI-AGA National Accounting Conference Plans Full Three-Day Program

THREE full days have been scheduled for general sessions and business meetings at the 1958 EEI-AGA National Conference of Electric and Gas Utility Accountants, to be held at The Shamrock Hilton Hotel, Houston, Texas, April 14-16.

The general session will start at 10 a.m. Monday, April 14. In past years, the first session began at 2 p.m. on the opening day of the conference. Registration is planned to begin on Sunday, April 13.

Elliott, Peterson Head Program

The conference, sponsored by the EEI Accounting Division and the American Gas Association Accounting Section, is being held in the Southwest for the first time. J. D. Elliott of The Detroit Edison Co., and Chairman of the EEI Accounting Division Executive Committee, and D. W. Peterson of the Minneapolis Gas Co., and Chairman of the A.G.A. Accounting Division Managing Committee, are in charge of the program, now being developed.

Two half-day sessions will be devoted to General Activities Group discussions and two similar sessions will be used to explore problems of the Customer Activities Group. Individual committee sessions also have been scheduled for two half-day periods.

Some of the subjects expected to be presented at the conference include:

Court and commission decisions relating to depreciation matters.

Proper accounting for the disposition of funds received in reimbursement for relocation work required in connection with highway projects as they effect depreciation.

Plant accounting and property records activities.

A study of present practices and plans for mechanization in small utilities and a project to study equipment housing customer accounting records for transmitting information as to service, accounts receivable, etc.

Current customer collection problems, centralization of customer accounting records vs. decentralization, and final billing.

Selection and training of public contact employees.

Responsibility accounting.

Measuring and comparing industrial auditing performances.

The Electronics Accounting Machines Development Committees are

(*Continued on page* 404)

50 Manufacturers Support National Electrical Week

MORE than 50 of the nation's leading electrical manufacturers have indicated their intention of supporting the objectives of National Electrical Week, Feb. 9-15, through national television, radio and publication advertising.

In addition, the industry's major programs—Live Better . . . Electrically and HOUSEPOWER, as well as related promotions sponsored by other organizations, including EEI, National Electrical Contractors Association, and National Wiring Bureau—are expected to launch their 1958 efforts during this week.

Science Youth Day, scheduled for Feb. 11, is an outstanding educational effort sponsored by the International Edison Birthday Celebration Committee and the Thomas Alva Edison Foundation, Inc., to encourage American youth to pursue scientific and technical careers. There is full cooperation between the NEW Committee and Science Youth sponsors.

Support from allied industries is expected to add impact to the NEW celebration. This week offers an opportunity for several American industries — chemical, aluminum, copper, steel and others closely allied to the electric industry to salute the benefits of electricity and their contributions to electrical progress in their national and trade advertising and company publications.

26 Sponsors

National Electrical Week is sponsored and endorsed by the 26 leading trade associations in the electrical industry and is an all-industry event with the principal objective of focusing attention on the contribution of electricity to our economy and way of life. It is carried out as an "umbrella activity"—a beginning - of - the - year springboard for all the various programs and educational or promotional objectives of the industry.

The NEW Committee's 1958 Planning Guide and Kit of Materials has been distributed to approximately 4,500 industry leaders and to many allied industries.

Extra kits may be obtained from the NEW Committee headquarters, 290 Madison Ave., N. Y. 17, N. Y., at

(*Continued on page* 391)

The Electric Industry in 1957 and Later

By J. W. McAfee

President, Edison Electric Institute and President, Union Electric Co.

THE electric industry reached its 75th year in 1957, continuing during the year its record of remarkable postwar growth, and its constantly increasing service to American life, economy and defense.

In the past seven years, or less than one-tenth of its history, electricity generating capability and production have each increased by over 90 per cent, while sales have doubled. Average annual use of electricity per residential customer has increased by 1,334 kilowatt-hours, the seven-year increase alone being greater than total use per residential customer only 11 years ago.

Electricity Generation in 1957

Generation of electricity by all components of the industry totaled 636 billion kwhr, an increase of 35 billion over 1956; sales of electricity reached 561 billion kwhr, an increase of 31 billion for the year; and average annual use per residential customer increased 195 kwhr to reach a total of 3,164.

Total Generation in USA

An additional 85 billion kwhr generated by industrial and railway plants pushed the grand total of electricity production in the USA to 721 billion kwhr during the year.

Generating Installations in 1957

During 1957, approximately 8.5 million kilowatts of new generating capability were added to the nation's power lines, bringing the total generating capability to 135 million kw by the end of December.

1958 Construction to Break All Records

The year 1958 begins with by far the largest construction program yet undertaken, including the scheduling of 16.25 million kw of new generating capability to go into service in 1958, as well as extensive construction of new transmission and distribution lines.

The installation of new generating facilities in 1958 will exceed the previous high record of 1955 by almost 4 million kw, and is about equal to the total net installations of the 10 years between 1937 and 1947.

Later Construction

During the next decade it is estimated that more than 130 million kw of net generating capability will be added to the present total.

The additions already scheduled (or on order) for 1958 and later include nearly 40 million kw in steam plants and a little more than 5 million in hydro installations. Of this total of 45 million kw, 37 million are planned for installation by investor-owned companies. The remaining 8 million have been scheduled by the Federal government and other public agencies.

Dynamic Qualities of the Industry

The progressive and dynamic qualities of the electric industry are demonstrated not only by its extraordinary service record, but also by its constant efforts to increase efficiencies and economies in generation and transmission of electricity, through continual pioneering in advanced engineering design, in its promotion of new uses for electricity, and in its promotion of the economic, social and aesthetic progress of its service areas.

In the new field of nuclear power, activities of the electric utility industry showed continuous progress and significant expansion during the year. Two experimental plants in which electric utility companies are participating went into operation, and the large-scale Shippingport plant is now under test and full-scale operation is expected early in 1958. Planning and construction work on other large nuclear generation stations showed continuing progress. A detailed statement on atomic power progress appears later in this review.

Investment and Construction Expenditures

Investment in electric plant and property of the investor-owned electric companies reached approximately $36.5 billion by the end of 1957. This figure has almost doubled in the past seven years.

During the past decade construction expenditures for generating, transmission, distribution and miscellaneous facilities have averaged $2.6 billion per year. The expenditures for construction in 1957 were $3.7 billion.

Construction expenditures budgeted for 1958 total $3.9 billion. Construction budgets are expected to average over $4 billion a year for the next several years, ranging up to $5 billion per year by the end of 1967.

Electricity Sales

Of the total 561 billion kwhr sold in 1957, industrial sales accounted for 285 billion, as compared with 277 in 1956. Sales to residential customers reached 147 billion kwhr, an increase of 13 billion over the 1956 sales. Sales to commercial customers accounted for 95 billion kwhr, compared with 88 billion in 1956. Sales to other customers totaled 34 billion kwhr.

Revenue

Gross revenue of the investor-owned electric companies totaled $8,047,000,000 in 1957. It was $7,521,000,000 in 1956. Net income was $1,405,000,000 in 1957, and in 1956 it was $1,346,000,000.

Financing

Approximately $2,550,000,000 of construction financing was realized from the sales and delivery of securities, and the remainder drawn from depreciation reserves, surplus accruals and short-term borrowing.

Bond sales and deliveries in 1957 totaled approximately $2,000,000,000, common stock $450,000,000, and preferred $100,000,000.

Taxes and Other Expenses

The investor-owned electric companies will pay $1,825,000,000 in Federal, state and local taxes for

1957, or 22.7 per cent of gross revenues, compared with $1,766,000,000 in 1956. Federal taxes were $1,100,000,000, and state and local $725,000,000. Wages and salaries, the next highest item in the expense account, totaled $1,420,000,000. This item was $1,335,000,000 in 1956. Fuel costs, the third highest item, were $1,390,000,000 during the year. Fuel costs totaled $1,236,000,000 in 1956.

Customers

Customers of the electric industry totaled 55,175,000 at the end of 1957, a gain of 1,180,000 over the preceding year. For several years over 98 per cent of occupied homes, both urban and rural, have been connected for electric service. Accrual of new customers is now largely determined by the establishment of new families and homes.

Residential and rural customers totaled 48.5 million at the end of 1957 and commercial and industrial 6.5 million. During the past ten years, residential and rural customers have increased by 15.4 million.

Residential Use of Electricity

Average annual use of electricity in the home passed the 3,000 kwhr mark early in the year, and at year's end was at the rate of 3,164 kwhr. This was an increase of 195 kwhr over 1956, and well over the average increases of the past decade.

During the ten-year period 1947-1957 the average annual increase in the residential use of electricity was 173 kwhr, as compared with 63 kwhr in the preceding decade.

Electricity's contributions to better living continue to win widespread acceptance. Major factors in the steadily increasing use of electricity in the home have been the growing acceptance of an ever-widening range of electrical appliances by the residential consumer, and the rapid extension of home air conditioning.

Expanding consumption of electricity and the promotional character of electricity rates, combined with continuing improvements in operating efficiency, have enabled electric companies to reduce the cost per kilowatthour of electricity to the consumer. This has been achieved despite rate increases and the general rise in the cost of living during the postwar years. The average revenue per kilowatthour sold to domestic customers was 2.56 cents in 1957, a decrease of 17.2 per cent from the 1947 average of 3.09 cents. The average revenue in 1956 was 2.60 cents.

Rate Increases

According to the records of the Edison Electric Institute, 499 applications for rate increases were made by electric companies to regulatory commissions from 1946 through the first 11 months of 1957. Of these, 440 were granted, 28 are pending action, 12 were withdrawn, and 19 were denied.

The 1957 record for the first 11 months shows 31 actions by the commissions, of which nine have been granted and 22 are still pending.

It is obvious from the high percentage of rate increase approvals that commissions generally recognize the necessity for rate adjustments to insure the financial health on which continuance of adequate electric service depends.

Ownership of the Electric Industry

Direct owners of electric utility companies — the stockholders — are estimated to number about 3.8 million, while nearly every American has an indirect financial interest in electric company operation. Included among the indirect owners are 106 million life insurance policyholders and an estimated 21.5 million depositors in mutual savings banks, as well as members, shareholders, or policyholders in various charitable and fraternal organizations, religious and educational institutions, foundations, etc., which are holders of electric company bonds.

Nuclear Energy and the Electric Industry

At the end of the year over 100 electric utility companies, together serving a majority of the nation's electric customers, were actively engaged in various phases of nuclear power research, development and construction. Sixty companies were participating in the planning or construction of 13 nuclear power plants, of which two were completed and placed in operation during the year, one was essentially completed and undergoing testing, four were under construction, and the remaining six were in various stages of planning. The seven plants either in operation or under construction are expected to have a combined capacity of more than 750,000 kw and involve expenditures, by the companies concerned, of over $285 million. The six projects in various planning stages will add substantially to both capacity and investment.

In addition to the 13 nuclear power plant projects, electric utilities are participating in four major nuclear power research and development groups. One group is carrying out research and development work in conjunction with a nuclear power plant project now under construction; two are undertaking major research and development projects looking toward eventual construction of nuclear power plants; one is undertaking a major research project in the field of thermonuclear energy. Additional electric utility companies are participating in a number of other study and research groups investigating various phases of nuclear power.

Last summer saw the initial operation of the first nuclear power plant designed to serve customers of a utility system. The experimental Santa Susana nuclear power plant, located about 30 miles from Los Angeles, is a joint effort of the Atomic Energy Commission, North American Aviation, and the Southern California Edison Co. It has a generating capacity of 6,500 kw.

In the fall, electricity was generated from the first nuclear power plant wholly financed by industry. The Vallecitos experimental nuclear power plant, with a capacity of 5,000 kw, is a joint project of the General Electric Co. and the Pacific Gas and Electric Co.

The Shippingport nuclear power plant, the world's first large-scale plant constructed primarily for the production of electricity, was completed during the year and is currently undergoing testing. Full-scale operation is expected in the early part of 1958. This project, a joint endeavor of the Atomic Energy Commission, Westinghouse Electric Corp. and the Duquesne Light Co., will have an initial capacity of 60,000 kw.

Major construction work on the 100,000-kw Enrico Fermi Nuclear Plant being constructed by the

Power Reactor Development Co. and The Detroit Edison Co., which began in the latter part of 1956, continued during 1957. Major construction work on the 180,000-kw Dresden Plant, a project of the Commonwealth Edison Co. and Nuclear Power Group, Inc., began in June of 1957. Site work on the 275,000-kw Indian Point plant of Consolidated Edison Co. of N. Y., Inc., and the 134,000-kw plant of Yankee Atomic Electric Co. began during 1957, and major construction work on both of these plants is expected to begin in early 1958.

During the year, several groups of electric utility companies undertook nuclear power development work. In February, 11 companies serving in the North-Central area of the United States formed the Central Utilities Atomic Power Associates. This group is undertaking the development and construction of a 66,000-kw reactor scheduled for completion in 1962. A contract with the Atomic Energy Commission to carry out the project under the third round of the AEC Power Demonstration Reactor Program was recently signed.

Also in February, 12 electric utility companies serving the Ohio Valley and contiguous areas formed the East Central Nuclear group. This group plans to undertake a program of nuclear reactor research and development which it believes will represent a significant advance in the technology and economics of utilizing nuclear fuel to produce commercial electric power.

In mid-1957, fifteen utilities serving Arkansas, Louisiana, Mississippi, Kansas, Missouri and Oklahoma, announced formation of the Southwest Atomic Energy Associates. This group has as its purpose to carry out a major research and development program aimed at practical use of atomic energy as a supplemental fuel for the future electrical needs of the states in which they serve.

In April of 1957, eleven Texas utility companies announced the formation of the Texas Atomic Energy Research Foundation. This group subsequently joined with General Atomic Division of General Dynamics Corp. in sponsoring a four-year, $10 million research program in the field of thermonuclear reactions.

Also during 1957 the San Diego Gas and Electric Co. joined with General Atomic Division of General Dynamics Corp. in undertaking nuclear power research work, and the Rockland Light and Power Co. formed a group with several manufacturing firms to carry out nuclear power investigations.

All told, electric utility companies are now engaged in a substantial effort aimed at bringing about the development of economic nuclear power at the earliest practicable time. While the technological challenges are indeed formidable, electric power companies, both individually and in groups, have continued to demonstrate their eagerness and competence to do their part in overcoming these challenges.

What Happened to Mr. Faraday's Observation

Mr. Gladstone, Queen Victoria's Prime Minister for many years, was once shown Michael Faraday's laboratory experiments dealing with the theory of the electric generator. Gladstone inquired of the great scientist, "Will this ever be of use to mankind?" Faraday replied, "Someday you will collect taxes from it."

It is obvious from the figure of $1,825,000,000 in Federal, state and local taxes assessed against the investor-owned electric companies for 1957 that the pure physics of electrical production have been converted into a sizable taxable product.

During the past 10 years, purchasers of electricity in the United States, through their electricity bills, have paid approximately $13 billion that in turn were paid over to Federal, state and local tax collecting agencies.

These purchasers, comprising approximately 80 per cent of the country's electricity consumers, are the customers, presently some 44 million, of the investor-owned, taxpaying electric companies.

During the next 10 years, on the basis of the trend in increasing use of electricity, and at the present rates of taxation, these customers will contribute additionally through the same means more than $25 billion to help defray the cost of government, in all its numerous activities.

These figures spotlight the advantages enjoyed by the customers of Federal and other public power agencies, who paid in their electricity bills no Federal taxes.

Federal tax payments by the electric power companies alone in 1957 were nearly one and one-half times greater than the combined total of all personal income taxes and all corporate taxes paid by business and industry in 1933, the year of the passage of the TVA Act.

In that depression year, and it was a low point in the general economy, Federal income taxes from individuals totaled $353 million, while taxes collected by the Federal government from all corporations in the United States totaled $394 million. The significance of these figures in relation to TVA and other Federal power projects becomes apparent in the light of today's tax burden. For fiscal year 1956, income taxes from individuals totaled over $35 billion, an increase of slightly over 99 times the 1933 figure. Corporation taxes for 1956 totaled over $21 billion, an increase of 53 times the amount collected for fiscal 1933.

The figures and comparisons presented above demonstrate the increasing magnitude of the disparity in taxation treatment of electricity consumers, who have common citizenship and common obligations in the same country. Striking as they are in a tax-conscious age, and important as they are in the national economy, they are not the only reason why an examination and a reappraisal of the position of the investor-owned electric companies in relation to governmental power enterprises are urgently needed. There are others—ethical and ideological—which transcend the economic considerations.

National Electrical Week

(*Continued from page* 388)

$1.00 each for every additional kit.

The kit contains: The National Picture—objectives of NEW, nationwide plans, support from national advertisers; Projects and Suggestions for state and local NEW committees; NEW ideas for industry groups and companies; Copy Platform—suggestions for news and advertising; Science Youth Day material; other program aids.

What Can We Do About Government Spending?

By Fred Rogers Fairchild

Knox Professor Emeritus, Economics, Yale University

Reprinted by permission of Tax Foundations, Inc., Copyright 1957 by Tax Foundations, Inc., 30 Rockefeller Plaza, New York 20, N. Y.

LAST spring and summer there was much discussion of the Federal government's budget, marked by keen interest on the part of the public and a real grass roots demand for reduction of government spending. It would appear that a good many people have learned that mere protest against burdensome taxation is getting us nowhere—that the only way to reduce taxes, while avoiding the even worse evils of inflation is by reducing government expenditures. This was something new to our experience, and most encouraging.

Federal Budget Soars

But what do we have to show for it? The mid-year estimate of expenditures in the Federal budget for 1958 (including the major trust funds) is nearly $83 billion, four billion *more* than the actual expenditures in 1957. If under unusually favorable conditions this is the best we can do, then some more fundamental attack would seem to be indicated.

Prerequisite to such attack is recognition of the revolutionary change in the Federal government's fiscal situation which has taken place within the past generation.

The termination of World War I brought a reduction of Federal expenditures from the war-time peak of $18½ billion to an average of $3¼ billion in the first post-war decade. War taxes were promptly reduced. Post-war expenditures were kept well below revenues, so that in 11 years the gross national debt was brought down from its war maximum of $26½ billion to $16 billion, a reduction of nearly two-fifths of the debt, at the rate of nearly a billion dollars a year. Here we have a picture of what we used to regard as normal post-war adjustment.

Now let us consider the corresponding record of World War II. During this war, expenditures rose from some $9⅔ billion to a peak of $100 billion. A decline to $35 billion in 1948 was reversed by the Korean conflict. Since 1955 expenditures have been rising to the present figure in the 1958 budget of $83 billion (including major trust funds). This is only $17 billion below the war-time peak.

Prior to World War II taxes were running at the level of $5½ billion a year. They rose to a war-time peak of $42¾ billion in 1945. They dropped slightly during the next five years. Thereafter they increased, till in 1957 the tax take was $77 billion, 80 percent greater than was collected at the war peak.

However, expenditures have exceeded even this unprecedented level of taxation, and deficits have been incurred in seven of the 12 years since 1945. The gross national debt rose from $43 billion in 1940 to a war-time peak of $279 billion in 1946. Today it is pressing hard on the present legal limit of $275 billion.

No 'Peacetime' Adjustment

Here is the picture of fundamental change in our Federal government's finances. Our last war has not been followed by the "normal peacetime" adjustment. Instead we see, in the present period of "peace", Federal expenditures only slightly below the war-time level, Federal taxes actually 80 per cent higher and the national debt, not in process of being paid off, but on the increase.

It may be that we shall never again experience the old-fashioned post-war era of peace. Defense costs can no longer be regarded as emergency expenditures. So far as we can now foresee, they are probably destined to remain high.

This does not mean that there is no room for careful cutting of costs. There is plenty of evidence of waste and extravagance in the spending of the Department of Defense; witness for a single example the competition and duplication of effort among the three arms of the military service. And in view of present demands for speeding up our missile-satellite program, we should not forget that to reach our goal it is not enough merely to spend a lot more money.

Non-Defense Budget Rises

Moreover, the responsibility for present high and increasing expenditures by no means rests on defense alone. In 1957, defense costs, in which I include "international affairs and finance", accounted for 55 per cent of total expenditures, and non-defense expenditures, 45 per cent. In the three years 1953-1956 defense expenditures actually declined by $10 billion while non-defense expenditures were increased about $5 billion.

It is in the non-defense part of the budget that the real opportunity for saving lies, and I would suggest three basic principles which should guide us.

Government is necessary; it has certain functions which the individuals cannot so well perform for themselves. But by the same token, government should be limited to these functions. No government should be authorized to do for the people those things which the people can equally well do for themselves.

The second principle is that, in the American concept, the government is created by the people, and the ideal government is that which best expresses the will of the people. The closer the government is to the people, the easier it is for them to

express their will and to see that government carries it out. It follows that every function assigned to government should be performed at the lowest practicable level.

The third principle has to do with the sovereignty of the American state. Our government is not a democracy in the strict sense. It is a republic, with sovereign government at two levels; the national government, limited to those functions delegated to it by the states in the Constitution; the states the residual holders of sovereign power.

This division of sovereignty and separation of powers was conceived by our founding fathers as one of the means to preserve the liberties of the people from an over-powerful government. By the Revolution they had acquired their freedom from a tyrannical English government, and they did not propose to lose it to the new government of their own creation. The soundness of their judgment has been amply demonstrated by experience. We need to be on our guard lest our Federal government's expenditures and tax exactions weaken and eventually destroy the sovereignty of our states.

In applying these basic principles to the problem of the Federal government's non-defense expenditures, the reader should be warned that this will mean a radical departure from prevailing attacks upon heavy government spending. Most of the recent discussion has gone on the theory that cuts must not be applied to government projects authorized by Congress. But this is the very place where cuts must be made if we are to accomplish anything. Here are some of the more important areas where that could be done.

Federal Lending Jars Imagination

The Federal government is in the lending business to an extent that fairly staggers the imagination. The total of the government's outstanding direct loans and guaranteed and insured loans as estimated for 1958 is $85 billion.

According to the basic principles which I have suggested, lending money has no place among the essential functions of the government of a free nation. Government has no source of loanable funds except what it takes by force from the people, through taxation, or obtains by first going itself into debt. The capital funds of a free people are loaned more equitably and more economically by their private owners, and we have banks, insurance companies, and other investment agencies well equipped to do the job.

Production of electric power has become one of the major functions of the Federal government. In the period from 1925 to 1956 the government's share of electric energy production climbed from less than one-fifth of one per cent to over 14 per cent of total United States production.

Federal Power Situation

The character of the Federal government's power business may be shown by the record of the Tennessee Valley Authority. TVA was inaugurated in 1933 as a "river development", with flood control and navigation as its primary objective; incidental electric power generated at the dams was to be sold to residents of the area. However, with the progress of time, production of electric power has steadily increased, until today four-fifths of TVA's investment is devoted to the electric power business, and nearly three-fourths of the power is produced by steam plants.

TVA has obtained its capital from money appropriated out of the United States Treasury and retained earnings from the sale of power. The amount of these appropriations on June 30, 1956, was just under $1½ billion, of which only $145 million had been repaid to the Treasury. No interest has been paid to the government on this money. Such unpaid interest had amounted to $357 million by June 30, 1956.

TVA is moreover exempt from all taxes to Federal, state, and local governments. "In lieu" of state and local taxes, it makes certain payments which, in proportion to gross plant investment, are only one-tenth of what private electric companies pay in state and local taxes.

By charging rates below cost and below what private companies can offer, TVA renders a valuable subsidy to the people in its territory; in short, they are getting their electricity at about half price, and the nation's taxpayers are making up the difference, about $90 million a year.

If TVA were sold to the public, a gross favoritism would be removed, the United States government would be relieved of the annual direct cost of over $19 million and of making further appropriations for its power business, and the nation's taxpayers would be the gainers on account of the taxes which the private owners would then pay.

The largest of all the government aids to special domestic groups is the veterans' program, which calls for almost $5 billion in the 1958 budget, $188 million more than is presently estimated for 1957. This item has been consistently over $4 billion a year in the last five years.

Of the $3 billion for compensation and pensions, more than $1 billion will be paid to veterans and veterans' families for disabilities and deaths not resulting from military service. Most striking is the record of hospitals and medical care. On November 30, 1955, for example, only 36½ per cent of Veterans Administration patients in hospitals were being treated for service connected disabilities.

No one wants the nation to be niggardly in caring for all veterans who suffered disability in military service or for the dependents of those who were killed in service. But it does not seem that that obligation should include those whose disabilities were not incurred in the service.

Farm Supports

The government has become involved in a gigantic program of aid to farmers, the principal means being the raising of prices of agricultural products. Under this price support program the government has acquired vast quantities of agricultural products, partly by direct purchase, partly through receipt of farm products pledged as security for loans.

In spite of the "soil bank" program adopted in 1956, the government's inventory of products purchased had grown to $5½ billion on May 31, 1957, and there was also $2

billion in products pledged to secure loans. It is to be expected that most of these will eventually be added to the inventory, making a total little if any less than $7½ billion.

The cost to the government of the agricultural aid program has been enormous. The budget for 1958 contains $5 billion for "agriculture and agricultural resources", $431 million greater than in 1957, and $113 million more than in 1956, the previous record year.

People Pay Twice

In the operation of this plan to raise agricultural prices, the government imposes a heavy burden of taxation on all the people and in addition compels them to pay higher prices than necessary for food and other necessities of life. Such action is no part of the necessary functions of the government of a free-economy nation.

Public assistance is a field, traditionally belonging to the states and the local governments, which the Federal government began invading in the 1930's. The program includes old age assistance, aid to the blind, aid to dependent children, and aid to the totally and permanently disabled.

During recent years the cost has been steadily increasing, from $1,332 million in 1953 to $1,750 million in the 1958 budget. Nearly all these expenditures are in the form of grants-in-aid to the states.

We have here a clear case of a government function which properly belongs to local government. Both administration and financing should be kept as close as possible to the people, who know local needs as a central government bureau never can.

Highway Program

The initial highway grant program was started in 1916. With the Highway Act of 1956, the Federal government has undertaken a long-term program of increased assistance to the states, which is expected to provide (1) nearly $25 billion over 13 years for a mainly Federal-financed interstate system linking the principal cities, and (2) $12 billion for the primary, secondary and urban system on a fifty-fifty matching basis.

It may be proper for the Federal government to exercise some advisory function over state highway construction in order to promote national unification. Otherwise all this represents a major expansion of a function which properly belongs to our states.

Public education has been in the hands of the American states and their local subdivisions from the beginning. In recent years the Federal government has been gradually edging into this field. The 1958 budget calls for $533 million, of which $447 million is for grants-in-aid. Considerable pressure is now being exerted to expand greatly the Federal contribution for school construction over a number of years in the future.

This is a function which in our American set-up is not appropriate to the Federal government. The state and local governments have spent and are spending huge sums on their educational systems. They will continue to do a better job, at less cost, if they finance their own education and keep themselves free from the interferences and controls which would almost certainly come in the train of large Federal grants.

Other Questionable Subsidies

These are some of the more important examples of expenditures incurred by our Federal government for projects which I believe it should never have undertaken or should have kept within narrow limits. There are many others, such as housing subsidies, calling for $362 million in the 1958 budget; aids to water transportation, in the budget for $420 million; administration of the unemployment compensation system; and very many items in the public works budget. Then there is the postal deficit, a subsidy to users of mail service other than the first class, estimated at $657 million in the 1958 budget.

Exact figures showing the total reduction in government expenditures which might result from adoption of these suggestions could be obtained only from a thorough-going audit of the budget, a task obviously beyond my resources. But from the facts here presented, I think savings well over $10 billion can readily be seen.

This is without taking account of whatever capital funds might be recovered through sale of the $17 billion of the government's direct loans receivable, or the billions invested in TVA and other power producing plants.

I believe there is ample evidence to show that, with the will of the Congress and the support of the Administration, and with the assistance of the Budget Bureau, tremendous savings are possible, which, without limiting any essential function of the Federal government, would provide a really significant reduction in government expenditures.

And this reduction would make possible a substantial cut in taxes.

Drastic Action Needed

In conclusion, I recognize that some of these suggestions may be regarded as pretty drastic. That they are, I freely admit. But I would point out that the legislation which brought us to our present state was drastic, and that action to reverse it will likewise have to be drastic. We have seen the futility of the more timid approach. The time has come for a courageous and vigorous attack.

A Catalog of

EEI Publications

is available upon

request to:

Edison Electric Institute

420 Lexington Ave.

New York 17, N. Y.

A Look into the Electrical Future

By Walter T. Lucking
President, Arizona Public Service Co.

An address before the Fourth National Power Use Workshop Conference, Inter-Industry Farm Electric Utilization Council, Denver, Colo.

IT is a privilege and a challenge to discuss so broad a topic as "A Look into Our Electrical Future." It is a challenge because I'm sure all of you have contemplated our future as much as I. I could learn much if this situation were reversed—if you were talking to me. However, guest speakers wouldn't be guest speakers if they hadn't yielded to the temptation of presenting their own ideas and those gained from friends and associates, and I warmly welcome this opportunity.

Established facts of the electric industry's growth in the past, and extensions of those trends made in the light of all factors, continue to present a picture of the future that is challenging to say the least. In fact at times it seems almost overwhelming.

Two factors that will have a basic effect on the future of our industry are the rapidly growing population of the country and the increased use of electric power per customer. These factors are becoming more evident daily and are presenting many problems to our industry.

The need for vastly expanded generating capability; adequate economical energy sources; greatly expanded transmission and distribution facilities; and methods for maintaining high service standards at reasonable rates. Those are some of the things I'd like to talk with you about.

The Census Bureau estimates that our population will reach 193 million by 1965; about 200 million by 1970. I personally think that those estimates are a little conservative, but at any rate they illustrate that we can expect a continuation of our current population growth for many years to come.

At present, the electric industry is serving 54 million customers and adding over 1 million new customers each year. From all indications, we will add new customers at an even faster rate beginning about 1960, when the bumper baby crop, which began in the early 1940's, reaches adulthood and starts establishing homes of their own.

The other major factor in our electrical future—increased use of electric power per customer—is equally important in its demands on the utility industry. The average annual use of electricity by residential and rural customers has soared to new heights, more than doubling in the last decade. At present, the national average is nearly 3,100 kilowatthours per customer. Most estimates place the figure at about 4,000 kwhr by 1960—about 5,700 kwhr in 1965, and up to nearly 8,000 kwhr in 1970.

I personally do not think that those predictions are over-estimated. These estimates do not seem overly optimistic when you consider that our average use today is based on a rather limited use of lighting and the major appliances now available. And who knows what new applications of electric service will appear in the future.

1960 Predictions Topped

I might point out, too, that some companies in the United States already have topped the average annual use predictions of 1960, with use per customer ranging from about 6,000 kwhr on up to more than 10,000 kwhr.

Taking a look at the rural customer alone, it is not difficult to see a use potential even greater than that of his urban cousin. The big job of rural electrification now is virtually complete with electric service to 97 per cent of the nation's farms, and available to another 2 per cent when they want it. The electric companies and cooperatives have a mutual and almost equal interest here, for 51 per cent of our farms are served by REA cooperatives and 43 per cent by the companies, with the remaining 6 per cent being served by municipal and other governmental systems. We have another mutual interest here, because the companies are selling electricity to REA cooperatives at low wholesale rates to help make the rural electrification program workable.

For the very reason that the farm market was the last to be developed fully, it is the youngster of the electric industry and has more opportunity for growth than other classes of service. Average annual use on the farm is only slightly higher than other residential use, except in locations where pumping for irrigation boosts the average to more than 8,000 kwhr.

While there are many indications that pumping requirements may become more general in the years ahead, this is not a factor considered in rather widespread predictions that farm use may well reach an average of 10,000 or more kilowatthours between 1965 and 1970. The farmer's electric service needs in his home are at least equal to that of the urban residence. In addition, electricity is rapidly becoming the workhorse of the barnyard and even the field.

To illustrate new developments in farm use, I'd like to tell you about a few our company has been keeping an eye on. An organization in our area is conducting experiments in a process which it calls "electro-soil conditioning." This process passes direct current through the soil to ionize the salts and obtain better water penetration of the soil. We've seen some amazing results of this process. Such installations would have a high load factor, operating 24 hours per day the year around. The developers say a rectifier with a 2 kw demand will handle 10 to 20 acres, depending upon condition of the soil.

A company in Texas has developed and is now producing what it calls the "Meadow-Master Greenhouse." It says the average unit, which is only an eight foot cube in size, will produce about 450 pounds of green supplemental feed *daily* at a cost of ½ cent per pound, or about 10 dollars per ton. The feed is raised in en-

closed trays with space heaters and refrigeration to maintain proper temperatures.

Experiments carried on in feed pens have illustrated that when cattle were cooled by large electric fans, they showed a 32 per cent greater weight gain per day than those fed under identical conditions but without the benefit of fans.

Whatever the future may hold in the way of new applications of electricity, I think it is obvious to all of us that we are going to have growth in terms of numbers of customers and average use per customer—growth at a remarkable rate.

While I certainly have no way of knowing what individuals in the electric utility field may plan to contribute toward increasing the population, I do know that we all plan to do our share in increasing the average electric use per customer. For the sake of our load factors, however, we are going to have to be more selective about it than ever.

It is on the subject of load factor and selective load building that I want to touch briefly, because that subject is of major importance in our battle to hold the line on costs and to provide adequate service at reasonable rates. This importance is certain to increase in the years ahead, and it is already a formidable problem.

Air Conditioners Cause Rise

One of our biggest load factor problems stems from the rapid rise of summertime air conditioning—ranging from room units to complete plants, and from farm and city homes to virtually all types of commercial and industrial use. While seasonal peaks are more pronounced in some areas than in others, the situation is becoming general the country over, and it is not uncommon these days to see summertime load peaks.

In offering the main ideas on how we might improve load factor through selective load building, your reaction may be, "That's where I came in." But starting where the electric industry came in, oddly enough, may not be a bad idea. I'm referring to lighting, which was the main cause for the birth of our industry. Somehow the cause of good lighting got lost in the advancements of the electric industry. True, we have promoted lighting for years, but we still are a long way from giving our earliest load the position it should hold at the present time. Roughly speaking, the sale of lighting is 20 years behind development in the field! Additional use of lighting would help load factors somewhat, being year-round load, with longer hours of duration during the winter months to oppose the air conditioning peak that comes during the summer.

While lighting is important, it probably will play a lesser part in leveling off seasonal peaks than will relatively new developments that are gaining a foothold as the principal answers to our major problems. Two of these developments are the year-round "heat pump" air conditioning system and electric resistance heating.

Heat Pump Developments

In the heat pump field, we see two developments aimed at cutting down on space required for the equipment: one is reduction of size of the single-unit type, the other is the trend to the split-unit heat pump, which is actually two separate units, with the larger reversible cycle cabinet installed outside for easy access and a saving of house space.

Both developments should make the year-round heat pump equipment more salable, particularly in the case of older buildings where making space for the equipment is really a problem. In addition, the portable or room-size heat pump, now under development, may prove to be a good year-round load builder.

A shortcoming of heat pump operation in colder areas, where supplemental heating still is required, has helped to some measure in developing the market for resistance type electric heating. In the past year, no other single application of electric use has grown so fast and has found such increasing acceptance as has resistance heating.

More than 300,000 homes are now heated electrically and estimates are that an additional 30,000 will have been added by the end of 1957. One million electrically heated homes are expected by 1960. In some cases, special rates have been found economically feasible to promote resistance heating use; in others, active promotion of the advantages alone has been sufficient to increase sales without special rates.

Selling points are the relatively low initial costs combined with maintenance and replacement costs that are practically nil, maximum zone control with individual room thermostats, no fumes and no noise.

Another subject of major concern to our industry is that capability to meet electric power demands of the future. Modern-day technology, expanded production capacity and the advantages inherent in the American system are going to continue to build a better way of life that uses more and more electricity. While selective efforts in load building are important for economy of utility operation, our principal responsibility lies in providing the capacity to meet those future demands, whatever the load factors may look like.

The most reliable industry and government estimates indicate that to meet the power needs of the future we will have a generating capability of at least 233 million kw by 1966, and perhaps as much as 250 million kw. Installed capability at the end of 1956 was 126.5 million kw; at the end of this year it will be approximately 135 million kw. That would be a gain of between 7 and 8 per cent, which is just what the gain has averaged over each year for the past 50 years, so it is plain to see that our trend is well established. And some sources believe the rate of growth may be even faster in the years ahead.

Source of Increased Power

As to where this greatly increased electric power capability is coming from, we find that only about 8 per cent of the total needed by 1965 can come from hydro-electric plants. The remaining 92 per cent must come from steam plants, a very small percentage of which will be atomic-fired by 1965. Traditionally, the government has not engaged in steam-plant power production, with the TVA region the only exception. I would be less than frank with you if I did not say that I hope this tradition will continue.

In the way of joining forces to meet this growth and to do it as economically as possible, I want to give you some examples of cooperation known as "pooling" and "integration of facilities" with which I have a first-hand acquaintance. I think they are very good examples, because nearly

every type of utility operation in the government, cooperative and company fields is represented.

Recently at Yuma, Ariz., we held groundbreaking ceremonies for a new power plant that is the result of cooperation between Arizona Public Service, the California Electric Power Co., and California's Imperial Irrigation District. The 160-thousand kw steam plant will meet increasing demands in the lower Colorado River region—southwestern Arizona, southeastern California, and in northern Mexico. Ownership of the plant is evenly divided between our company and Calectric, with construction of the first 80 thousand kw unit to be completed by them in 1959, and ours to be completed in 1962. IID will share in the output of the plant, but will not own or construct any of the generating facilities. Arizona Public Service will provide the operating staff.

Lines of the three utilities are interconnected through the USBR Parker-Davis system. In addition, new transmission lines are planned to obtain still more advantage from integrated system operations. The IID, California Electric and their subsidiary in northern Mexico, and Arizona Public Service all believe that the formation of this power pool reflects cooperative long-range planning to a great mutual benefit.

I want to mention briefly some other examples of cooperation with which I have firsthand acquaintance. A couple of years ago our company placed on the line a new 200 thousand kw plant, located in the desert about 30 miles north of Tucson, in the south-central part of the state.

Unusual Location Explained

To Arizonans outside the utility industry, it was not easy to explain what seemed to them to be the unusual location. The fact is, we chose the plant site after lengthy consultation with authorities of the USBR, the Arizona Power Authority, which acts as a distributor of power from the Bureau's Colorado River projects; and with other producers and suppliers of power within the state, including companies and cooperatives.

Location of our plant at the southeastern leg of the USBR's Parker-Davis transmission system was advantageous for all of us. It firmed up the generation and transmission system of the entire state. It effected economies by making the best use of existing transmission lines and by reducing loss in transmission.

Although we might have chosen a location more expedient to our own immediate needs, our company knows that in the final analysis the plant is more practical for us because of its integration in the overall power supply picture. Either directly or with measureable indirect benefits, location of the plant helps systems of the USBR, the Arizona Power Authority, REA's and companies, and the Salt River Power District.

Expensive Duplication Eliminated

It is the latter organization with which we work side-by-side in the populous central part of Arizona. I say "side-by-side" because we have avoided expensive duplication of facilities and have entered into exchange purchase-power agreements. We know that our agreements along that line will be mutually advantageous, both from the standpoint of economical operation and in meeting the demands of the area we serve.

In leaving this subject, I want to say that I know such cooperation is not peculiar to our area and that all of you know of similar examples. I think we should give much emphasis to that area of operations, however, because it is another major key to success of utility operations in our country's electrical future.

And now I want to move on to the subject of energy—the energy to produce these vastly expanding needs for electricity. At present, our total thermal power is generated about 69 per cent from coal, 22 per cent from natural gas, and 9 per cent from fuel oil. Looking ahead, we can see the time about 15 years away when the annual requirements of electric generation would just about consume the total yearly production of any one of those so-called fossil fuels, as production of them stands today.

There are two schools of thought regarding the supply of fossil fuels. One is that the increasing demands by our industry and others will eventually cause us to exhaust the supply.

The other contention is that discoveries of new fields as yet undeveloped, and others as yet undiscovered, will supply our needs for much longer than we can calculate. While there is merit in both evaluations, I think reason leads us to conclude that eventually the cost of recovery, and that of transportation or transmission of the fuels, will cause us to look for more economical fuel sources. I believe another prime economic consideration is that the fossil fuels are becoming more valuable as a source of raw materials in the production of chemicals, rather than as combustible fuels.

It is possible that there are thermal sources as yet unknown, but those which we do know about are atomic energy and solar energy. I want to talk specifically about them, but first I'd like to touch upon another important factor relative to the fuel outlook in our electrical future. That factor is the increasingly high efficiency that we are developing in use of the fossil fuels. In the early days of our industry, we got about 460 kwhr from a ton of coal. Today we can get about 3,450 kwhr from a ton of coal! This is one of the greatest tributes to the engineering genius of our industry that I know of, and they are still improving on the situation. They have made it possible for us to get about one thousand more kwhr out of a ton of coal now than we did during the World War II years. Such remarkable efficiency has tremendous effects on economy of operation, upon the supply of fossil fuels, and is a major reason why we have been able to hold the line on rates in comparison with practically every other commodity.

18 Atomic Plants

No other subject than atom-fired steam generation has been kicked around so much during the past few years, and I'm sure we won't finish the discussion here or in the foreseeable future.

To take a look at where we stand with atomic plants right now, 18 are in various stages of planning and construction in this country; 13 as the projects of companies and five by non-Federal and cooperative organizations. The 18 plants will have a combined ultimate capacity of about 1,700,000 kw.

Six of the 18 atomic plants are scheduled to be in operation by 1960, and the others some time afterward. I think this represents a good start with a field in which we still have much to learn, but you can easily see

that atomic generation is going to be relatively small during at least the next 8 to 10 years. Strongest estimates are that it will not be more than 15 per cent of the total by 1965.

Because of the many unsolved problems concerning nuclear reactors—there is also some question about our approach to this new development. Some believe we should use our money for further research to reach conclusions; some say we should start building plants on a more widespread basis to learn as we go, and to lead the world in this development. As far as our country being the leader is concerned, I, too, would like to see that situation. But on the other hand, I think that we must be realistic. Other countries, England for one, have a much greater immediate need for atomic generated electric power than we do. I think it would be a mistake for this country to get into a reactor race simply for face-saving purposes, and particularly if it is to be at the taxpayers' expense.

There is no doubt that somewhere down the line, when the price of fossil fuels goes up and atomic costs are brought down by improved methods of use, atomic generation of electricity will be better economically. We will all be glad to see that day, but it is not "just around the corner."

Where Solar Energy Stands

The subject of solar energy may seem a little farfetched to some of you, but I think it is our duty, and in keeping with the utility industry's interest, to explore every possible use of energy. Although there has been much experimentation and minor development in utilization of solar energy for more than a century, there was never much combined and organized effort before 1955. In November of that year, at Phoenix, a world-wide symposium and exhibition took place under auspicies of the University of Arizona, Stanford Research Institute, and the Association for Applied Solar Energy. Our company participated fully in that activity, and we are continuing to do so in our plans.

I don't think any of us will be around long enough to see electricity generated by solar energy in any appreciable amounts, but I do believe we can look forward to some developments of considerable interest within the next 10 years. Even at the present, there are various solar energy applications that promise to be of great value in remote and relatively undeveloped parts of the world. These include solar cookers, water pumps, and distillation equipment to make water usable for domestic and agricultural purposes.

A development that may be of immediate interest in the utility business is that of solar heating and air conditioning equipment. These would be only supplemental to conventional equipment, as they are viewed now. In the case of solar refrigeration air conditioning, there is a good possibility that its daylight-hours operation would help relieve the sharp peak loads we are now experiencing.

The Association for Applied Solar Energy has just chosen a solar architectural design for a home to be constructed in Phoenix early next year. It was selected from 113 entries, coming from solar researchers and architects in 13 different countries. That illustrates increasing momentum in development in the solar energy field, and I believe that it will eventually be of benefit to our industry, to the country, and to the world as a whole.

We are privileged to be a part of the electric utility industry, and to serve the constantly growing needs in these days of great progress. I have confidence that we can meet the requirements of our better living standards in the future of America. It will require diligence and hard work; it will require great imagination and ingenuity, combined with cooperation among ourselves. Our past success and experience should serve to provide faith and confidence, which also will be required. With those things to motivate and guide us, I am confident we should have no fear or doubts about "looking into our electrical future."

Deadlines Approach for EEI Awards Entries

Deadlines for entries in the 1957 EEI Sales Promotion Contests are:

February 1, 1958

Farm and Industrial Sales Promotion Contests

February 15, 1958

Residential and Commercial Sales Promotion Contests

The new simplified rules in this year's contests eliminate much of the work previously needed in preparing entries. Better start compiling data and exhibits now!

Awards Committee

Edison Electric Institute

420 Lexington Ave. New York 17, N. Y.

'Look Up and Live!', White Tells Construction Safety Meeting

"LOOK Up and Live!" was the theme of an address presented by Raymond W. White, manager of the Claims and Safety Department of Pacific Gas and Electric Co., before the Construction Section of the 45th National Safety Congress and Exposition in Chicago. This slogan is being adopted as a theme to help in the elimination of deaths and serious injuries resulting from contact with overhead electric power lines by equipment, tools and other mobile objects.

"If all persons engaged in work which involves the raising of objects into the air will first 'look up' and then take proper steps to avoid contacts with any overhead electric power lines in the immediate vicinity, they and their fellow workers will live to work again," Mr. White said.

Utilities' Accident Programs

Mr. White, in seeking cooperation of the construction industry in establishing a program to help eliminate such accidents, cited the efforts of many electric companies throughout the nation which, in cooperation with state and local governmental agencies, are conducting accident prevention programs as a public service. Utilities are using newspaper advertising; radio and television programs; sound motion picture films; pamphlets; direct mailing to contractors, union members, farmers and others; as well as personal appearances before contractor groups, union meetings, farmer groups and public service groups to advance their programs.

The construction industry by joining this program can bring about substantial accomplishments, Mr. White told the meeting. He said:

"Both contractors and workers have the overriding motivation of the saving of human life in the prevention of these accidents. In addition, contractors and owners have vital financial reasons for eliminating such accidents. Insurance premiums, damage claims, work stoppage, contract losses, cost of training new skilled employees are but a few of the reasons. The workers are vitally interested because they are the ones who will be killed or injured, and because their families and their job opportunities also suffer.

"Electricity in our modern civilization is a wonderful and indispensable servant," Mr. White continued. "However, like many other modern conveniences such as the automobile or airplane, it must be used or treated with proper respect. Carelessness can transform a wonderful servant into a horrible monster.

"Overhead power lines long have been used as the only feasible way of bringing electricity to the majority of our citizens. Almost all construction jobs find the use of electricity essential today. Your electric companies construct overhead electric lines to high standards of safety. This method of distributing electricity has been used for a long time in our present civilization with reliability and safety. It is the failure to 'look up' and keep a safe distance from such overhead lines that brings about accidents."

Mr. White told the Construction Section that if the "Look Up and Live" message is carried far enough, loud enough and often enough to those persons having potential exposure in their work, this type of accident can be reduced to a minimum or eliminated entirely.

Concerted Action Needed

"There is a need for concerted action, properly coordinated, between contractor associations, labor unions, state and local authorities, electric utility companies and the National Safety Council. This action should provide the thorough and repeated dissemination of information to all members of the construction industry, emphasizing the theme of 'Look Up and Live' and stressing how proper care in the movement of objects will save the life of a fellow worker and prevent horrible suffering for those who might be maimed but are not killed instantly."

He listed many of the suggestions which have been advanced for avoiding this type of accident: blocking of crane wheels on trucks, blocking of turning or lifting mechanisms so that booms may not be moved beyond a safe point, building of physical barriers, proximity alarm systems to warn when a boom is brought too close to power lines, contacting the local power company in advance so that the line can be deenergized, raised, rerouted or other precautions taken. Mr. White said all these measures were helpful in varying degrees and that the exact solution would differ, depending upon circumstances.

California Sets Regulation

In California, Mr. White pointed out, the law requires maintaining a minimum distance of at least six feet from overhead electric power lines at all times. State safety inspectors require mechanical blocking or locking of equipment to preclude the possibility of contact.

"The first rule to follow," Mr. White continued, "is to 'look up' frequently to discover whether overhead power lines are in the vicinity. Once this is determined, the other steps should be taken. However, it must be noted that visual observation of an overhead wire from the ground often can be misleading. The angle of sight, light conditions, atmospheric conditions, background conditions and other factors may make determination of exact distances difficult.

"Perhaps one of the most graphic illustrations of the need for continual observation and awareness can be quickly given by a brief summary of the tragic facts of a case which happened in our territory a few years ago," Mr. White said. "A salesman was demonstrating a boom-equipped truck designed for

trimming trees. He intentionally brought it to an area in the immediate vicinity of a 12,000-volt overhead electric power line to demonstrate its mobility.

"After several conversations concerning the proximity of the wires and how the equipment would avoid them, the salesman proceeded to demonstrate the equipment and in doing so misjudged the distance and moved the bucket in which he was standing directly into the 12,000-volt line. Both he and the bucket were engulfed in a tremendous flame and eventually the bucket disintegrated, dropping what was left of the salesman to the ground. Needless to say he was horribly burned and was dead upon arrival at the hospital.

Awareness Plus Precaution Needed

"This indicates that awareness is not enough. Further precautions must be taken. The equipment should have been located and blocked so that the farthest extension of the boom could not have brought it closer than six feet from the power line. A discussion of the problem in advance with the local power company is recommended if careful appraisal of the job indicates no method of performing the work without coming in close proximity to the power lines—any distance closer than six feet, Mr. White suggested.

Discussing statements made to the effect that electricity can arc and jump through the air while booms are several feet away from the power lines, Mr. White said such statements are incorrect and misleading.

Arcing Distance Is Small

"They do a disservice to proper understanding of this subject. The distance which electricity will arc or jump in an air gap or space under given conditions is a scientific fact. Air acts as an insulator or nonconductor of electricity. The American Institute of Electrical Engineers, in cooperation with the American Standards Association, has published a standard* which sets forth arcing distances. It shows that the arcing distance of electricity is normally considerably less than one inch at voltages as high as 40,000 volts.**

"It should be remembered that most distribution voltages range from 2,300 volts to 12,000 volts. Higher voltages are used for transmission but such lines are few in number. Even the very highest transmission voltages now in use in the United States will not arc or jump several feet through air, as has been claimed."

Mr. White contended that perhaps some of the confusion has arisen from the fact that once a contact is made, an arc will be caused to stretch out when the contacting object is drawn away from the power line, and there may be a spectacular display of "fireworks" before the arc thus induced is actually broken.

"This cannot happen," he explained, "until direct contact is made or the boom has been brought so close to the line that it is within the arcing distances shown in Standard No. 4."

A cartoon and a sound film were shown and copies of two booklets were distributed by Mr. White in which the importance of "looking up" is stressed. The safety cartoon, used by Pacific Gas and Electric Co. on its television program, warns of the need to "look up" and keep away from power lines. A 35-mm sound film, prepared by the company, deals with the major causes of the accidents. The pamphlets were "Look Up —Power Lines Are Overhead," published by PG&E and "Keep Away from Power Lines," published by the Division of National Safety, State of California.†

Mr. White concluded: "The construction industry and its workers have an obligation to reduce these accidents. Knowledge and information to bring this about are available. We solicit your action to bring this message to the attention of every person engaged in construction activites. Our message is simply that: "whoever you are . . . wherever you work . . . if you have any equipment that reaches into the air, remember power lines are overhead. Look Up!"

*Standard No. 4—American Standard for Measuremert of Voltage in Dielectric Tests, Sept. 11, 1953.

**Table 1A on Page 19 of this Standard shows that at 12,000 volts the arcing or jumping distance is only 0.5 CM or 0.197 inches—approximately 3/16th of an inch.

†Copies of the television cartoon, sound film and the two pamphlets are available. Those interested in purchasing any or all of this material may get information from Raymond W. White, at the Pacific Gas and Electric Co., 245 Market St., San Francisco, Calif.

Copies Now Available! ! !

Underground Systems Reference Book

Another large supply of EEI's new *Underground Systems Reference Book* has been bound and copies are now available.

★

We're sorry for the delay in delivery, but the demand was so great for the book that the initial large printing of bound copies was exhausted in three months.

★

The price per copy for one to nine copies: $11.50 to member companies; $12.50 to non-members, postage prepaid in USA. Ten or more copies—FOB, Clinton, Mass. Quantity prices available upon request.

★

Address inquiries or orders to:

Edison Electric Institute

420 Lexington Ave. *New York 17, N. Y.*

How to Evaluate the Results of HOUSEPOWER Activities

By Donald W. Runquist

Commercial and Industrial Sales Manager, St. Joseph (Mo.) Light & Power Co.

An address before the EEI Southwest HOUSEPOWER Workshop, Oklahoma City, Okla., Oct. 18, 1957

I THINK we all agree that the HOUSEPOWER Program is one of the most successful mass selling promotions ever made by the entire electrical industry. I doubt that a day goes by without most of our customers seeing or hearing HOUSEPOWER on TV and radio, in trade publications, magazines and other advertising media. Our 1958 goal is to translate this accepted term, HOUSEPOWER, into more and more rewired homes. One of the 1958 objectives is research and reports of results in the field.

Home Wiring Dept. Established

In 1947, our company established a Home Wiring Department, with promotion based on personal calls on home owners by our sales people. In order to assess the value of such a program, we established some reporting methods which we believe are fairly effective.

The majority of our customers are located in the immediate St. Joseph area, and most of our rewiring sales work has been done in this area. St. Joseph is a city of about 80,000, located in northwest Missouri, and approximately 50 miles north of Kansas City. We have approximately 20,000 residential customers within the city limits, and a meter survey in 1949 revealed that around 11,000, or 55 per cent, of our customers had two-wire services.

Determining Results

At that time, the problem of determining overall results appeared to be simple. We merely checked the meter records each month, and assumed that the difference in the number of two-wire meters revealed the change from two to three-wire. However, this information was of no value when our Meter Department started a program to replace all old two-wire meters with a universal type meter which can be connected for either two or three-wire service. With no data being kept in the field, we decided to establish a new reporting system. This system involves cooperation with the city electrical inspector and several company departments.

CITY OF ST. JOSEPH — ELECTRICAL INSPECTOR

NAME John Doe — DATE 8-19-57

ADDRESS 2724 Felix Street

ELECTRICAL CONTRACTOR Nick Schultz

Electrical wiring at the above address has been inspected, and is approved.....

Service Entrance

(100 Amp. 1 P.
(_____ Amp. 3 P.
(_____ Amp. 3 P. 4 W.

FOR TEMPORARY CONNECTION _____

FOR PERMANENT CONNECTION x

IS CONDEMED _____

New Service _____

Increase Over 2-30

CITY ELECTRICAL INSPECTOR

Figure 1.

We prepare and furnish postcards to the city electrical inspector. (Figure 1.) Our local code requires an inspection and written approval of the wiring by the city before a connection is made. The card meets the city requirements and, in addition, gives us an accurate accounting of wiring changes within the city.

The Connect and Disconnect Sheet (Figure 2) is a standard intercompany form used by the Service and Customer Accounts Departments, and records every meter change occurring within our entire system. The meterman or serviceman on the job notes the capacity of the new service entrance, and the Customer Accounts Department provides information on the rate—i. e., either Commercial, Rural, Residential, etc. There is some

TABLE I—IMPROVED WIRING PROGRAM
Domestic Service—Existing Homes, St. Joseph, Mo.

	3-Wire Entrance Changes				
Year	60 Amp	100 Amp	200 Amp	Total City Records	% 100 & 200 To Total
1950	385	5	2	392	2%
1951	327	6	—	333	2%
1952	289	8	—	297	3%
1953	362	27	3	892	8%
1954	428	86	7	521	18%
1955	421	154	6	581	38%
1956	361	210	30	601	40%
8 Mos.-1957	206	239	11	456	55%

duplication of information between this and the first form, but the latter serves a quick double check on the city information, and also provides necessary information on wiring changes in rural areas.

Contractor Cooperates

The Wiring Installations—Contractor Report (Figure 3) is a recent addition, from which we obtain the actual amount of interior work completed. This again is a postcard on which we complete the first three lines, and then forward to the electrical contractor involved on a specific job. The contractor, in turn, completes the card, filling in information on the number of circuits and outlets installed. We do not obtain complete cooperation in all cases, but, on the whole, the results have been satisfactory. For instance, an analysis of 100 cards for recently rewired homes indicated that the average job consisted of a 100-ampere main entrance, along with five new circuits, five convenience outlets and two lighting outlets. The average cost of these 100 jobs was $210 each.

The Wire Entrance Changes (Table I) shows an overall summary of three-wire entrance changes within St. Joseph, by years, from 1950 through 1956 and a total for the January through August period of 1957. During this time, there have been about 3,500 wiring changes, which means we have a long way to go before all of our customers have full HOUSEPOWER and are ready to Live Better Electrically! It is encouraging, however, to note the increase during 1955 and 1956, and also the ever-increasing percentage of 100 and 200-ampere services which are being installed. We feel that the impact of HOUSEPOWER shows, with the 55 per cent figure for 100 and 200-amp services during the first eight months of 1957.

Need for 'Selling Up' Cited

In an Analysis of 1956 Changes (Table II) it was shown that all of the 200-amp service entrances were installed by customers having an existing three-wire service. I think this points out the need for "selling up" in many instances.

One thing always leads to another when results are being evaluated, and we wanted to find out why our customers rewired. In a Customer

CONNECT AND DISCONNECT SHEET

ORDER NUMBER	NAME	ADDRESS	NATURE OF ORDER	SERVICE	ASSIGNED TO	CUT OUT READING	EXECUTED BY	REMARKS
9-3-1945	Vacant	604 N. 9th	3-60 Disc. Con. new work				Mc.P.	Set meter
"	"	"	Disc.			01950	"	Meter in
11-3-5180	Percy M. Mabie	1512 Jules	3-100 Disc. Con. new work				Work	Set meter
"	"	"	Disc.			00082	"	Meter in
16-3-5441	Jos. Kneip Jr.	802 S. 15th	3-100 Disc. Con. new work				Work	Set meter
"	"	"	Disc.			01228	"	Meter in
4-3-2210	Guy Haviland	801 N. 25th	3-60 Disc. Con. new work				Work	Set meter
15-3-2915	W. C. Christian (Mr.)	1214 So. 22nd St.	3-400 Disc. Con. new work			7 KW 52	Work	Set meter
"	"	"	Disc.				"	Meter in
5-3-4821	Mrs. A. Mauk	905 N. 12th	3-60 Disc. Con. new work				Work	Set meter
"	"	"	Disc.			1932	"	Meter in
3-1-240	Mrs. E. Hammond	1317 Mary	3-100 Disc. Con. new work				Work	Set meter
"	"	"	Disc.			6568	"	Meter in
121-465	James E. Lyles	3211 Francis	3-100 Disc. Con. new work				Mc.P.	Set meter
"	"	"	Disc.			3474	"	Meter in
19-2-2595	Minnie Anderson	2449 Penn	3-100 Disc. Con. new work				Mc.P.	Set meter
"	"	"	Disc.			8349	"	Meter in
19-1-128	Ralph D. May	1402 S. 15th	3-100 Disc. Con. new work				Mc.P.	Set meter
"	"	"	Disc.			9375	"	Meter in
5-3-3018	Alfred C. Melton	1619 Park Ave.	3-60 Disc. Con. new work				Elec. Work	Set meter
"	"	"	Disc.			683	"	Meter in
	Treasure Concrete	18th & Mary	Conc. Con. new work			0870	Elec. Work	Set meter
15-1-895	Merrell Duncan	2920 Patee	3-100 Disc. Con. new work				Work	Set meter
"	"	"	Disc.			01887	"	Meter in
11-5-3492	Chas. A. Linkins	2316 Mitchell	3-100 Disc. Con. new work				Work	Set meter
"	"	"	Disc.			0812	"	Meter in
24-5-65	Jos. Cunningham	R#26 RD	3-100 Disc. Con. new work				Work	Set meter
"	"	"	Disc.			0191	"	Meter in
28-1-645	Ralph Thompson	6102 King Hill	2-60 Disc. Con. new work				Mc.P.	Set meter
"	"	"	Disc.			0476	"	Meter in
21-1-680	George Waddick	1319 Boyd	3-60 Disc. Con. new work				Work	Set meter
"	"	"	Disc.			7640	"	Meter in

Figure 2.

WIRING INSTALLATIONS - OLD HOMES

Name Joseph Jones

Address 924 North 9th Street Date 4-23-57

Service Entrance Installed 100 Amps

New Circuits Installed:

15 Amp. _____

20 Amp. 5

30 Amp. 1 - Dryer

Range 1

Convenience Outlets 8

Lighting Outlets 2

Electrical Contractor Pioneer Electric Date 8/8/57

Figure 3.

TABLE II—ANALYSIS OF 1956 3-WIRE SERVICE CHANGES

60 Ampere Service Increases	
353	from 2 Wire 30 Amp.
1	from 3 Wire 30 Amp.
354	Total
100 Ampere Service Increases	
170	from 2 Wire 30 Amp.
2	from 3 Wire 30 Amp.
28	from 3 Wire 60 Amp.
210	Total
200 Ampere Service Increases	
26	from 3 Wire 60 Amp.
1	from 3 Wire 100 Amp.
27	Total

585 Total increases (where previous service size was known).
523 Service changes or 89.4% were from 2 Wire 30 Amp.
62 Service changes or 10.6% were from 3 Wire 30 Amp., 60 Amp. and 100 Amp.

Note: Total increase for 1956 was 601. Sixteen cards received from city inspector failed to indicate existing or previous size.

TABLE III—IMPROVED WIRING PROGRAM
Domestic Service—Existing Homes, Customer Survey, St. Joseph, Mo.

	Entrance Changes Capacity		
Year	60 Amp	100 Amp	200 Amp	Total
1955	421	154	6	581
1956	361	210	30	601

Reason for Entrance Change:	1955	1956	1955-56 Total
Total Contacted	510	507	1017
Total Changes	581	601	1182
Appliance Purchases:			
Air Conditioning	128	90	218
Range	65	63	128
Dryer	33	31	64
Other	10	3	13
Future	3	3	6
Total Appliances	239	190	429 (42.2%)
Improved Service	271	317	588 (57.8%)

TABLE IV—IMPROVED WIRING PROGRAM
Domestic Service—Existing Homes, St. Joseph, Mo.

ENERGY CONSUMPTION DATA, 1955-56

Total Checked 359
Total Changes 581

		Kilowatt-Hours Before Rewiring	After Rewiring	Increase	% Increase
Appliance Purchase	(197)	437,246	618,518	181,272	41%
Improved Service	(162)	332,494	393,329	60,835	18%
Total	(359)	769,740	1,011,847	242,107	31%

Survey (Table III) in 1955 and 1956, we called on 1,017 customers who had rewired, and found that 42 per cent did so because of an appliance purchase, with the other 58 per cent rewiring because of the desire for improved service (safety is included under the latter classification). I might add that we started out on the project with the idea of determining the reason for the 100-amp service as compared to the minimum 60-amp service required. In view of similar survey data gathered by other companies, we couldn't believe the percentage figures and expanded the survey to include all customers who had rewired in 1955 and 1956.

Energy Consumption Comparison

As a further check on the percentage figures in the limited survey, we completed a 12-month Energy Consumption Comparison (Table IV) for 359 customers, about equally divided between those indicating an appliance purchase and those desiring improved service. I think that this comparative data is quite significant, particularly the 18 per cent kwhr increase recorded for those customers who rewired because they wanted improved service. We assume that customers rewiring because of an appliance purchase would do so regardless of any sales work on our part, but the kwhr growth shown by customers in the other category clearly reveals the importance and value of the HOUSEPOWER program. The 18 per cent increase for these 162 customers compares to our average yearly residential growth of 5.5 per cent, and the national average of 6.4 per cent.

We keep records (Figure 4) on all new homes completed in our service area, with material obtained from the city building department. One of our secretaries copies this information monthly from the record of building permits issued at the city hall.

We use a 5 x 8-inch card to record

TABLE V—CITY OF ST. JOSEPH, MO.
New Residential Building

	1954	1955	1956
Completed & Inspected Residences	283	202	187
Family Units	291	202	189
Certified Adequate Wiring	24	28	40
% Residences Certified	8.5	13.4	21.3
Layouts Submitted	68	43	70

Service Entrance

	1954		1955		1956	
	No.	%	No.	%	No.	%
60 Ampere	226	77.7	134	66.3	65	34.4
100 Ampere	61	21.0	63	31.2	112	59.3
200 Ampere	4	1.3	5	2.5	12	6.3
Totals	291	100.0	202	100.0	189	100.0

General Information — Average Residence

	1954	1955	1956
Square Feet	1,096	1,220	1,218
General Purpose Circuits	4.5	4.3	4.9
Special Circuits	.6	.8	2.3
Lighting Outlets	13.3	14.8	17.3
Convenience Outlets	21.3	22.4	25.5

information on the wiring installed in every new home.

Where we have made the wiring layout, the column Recommended is first completed and is used by our field representative in comparing the actual Installed against that originally Recommended.

Switch, Outlet Information

The Home Wiring Check Form is merely the reverse side of the 5 x 8-inch check card and gives information on the number of switches and outlets Recommended and Installed in the home.

Summaries of all the other data provide New Residential Building data. Several points are notable; first we have seen a substantial increase in the number of homes with Certified Wiring and secondly, the number of 100 and 200-amp services installed has increased from about 22 per cent in 1954 to almost 66 per cent in 1956.

Full HOUSEPOWER Installed

Although we don't have complete totals for 1957, a summary in July indicated that the percentage of 100 and 200-amp services in new homes is at the 80 per cent level. In the general information category, we have also noted a substantial increase in the number of circuits and outlets provided. All in all, it appears to us that Full HOUSEPOWER is being installed in the majority of new homes in our service area.

Date _____

Address James Smith Folio No. 8-1-1940

Name 1 Woodson Place Living Area 2340 Sq. Ft.

General Contractor Chas. Homan Electrical Contractor Kerns Electric Co.

Wiring Layout by St. Joseph Light & Power Co., Ruby Jones Representative

		Recommended	Installed
	Entrance Amperes	100	100
	General Circuits, 15 Ampere	xxxxxxxxxxx	
	General Circuits, 20 Ampere	3	3
Special Circuits	Range	x	1
	Water Heater		
	Air Conditioning	x	
	Dishwasher & Waste Disposer	x	x
	Automatic Washer	x	x
	Clothes Dryer	x	x
	Kitchen Vent. or Attic Fan	x x	x x
	Weather Proof Outlet	3	3
	Total Circuits	10	9
	Total Outlets and Switches	183	185

Remote Controls _____ Master Controls _____ Conventional x

Approved for Certification x Reason (If not approved) _____

Inspected by H. E. Nichols Date 9-3-57

	Multiple Switches		Number of Outlets				Approved for Certification
			Lighting		Convenience		
	Rec.	Inst.	Rec.	Inst.	Rec.	Inst.	
Front Entrance	1	1	1	1	1 WP	1 WP	
Rear Entrance	1	1	1	1	2 WP	2 WP	
Reception Hall	1	1	1	1	1	1	
Living Room	2	2			7	7	
Dining Room	1	1	1	1	4	4	
Library or Den	1	1	1	1	5	5	
Breakfast Room	1	1	1	1	3	3	
Kitchen	1	1	1	1	7	7	
Utility Room	1	1	1	1	4	4	
Hall	1	1	1	1	1	1	
Bedroom #1	1	1	1	1	5	5	
Bedroom #2	1	1	1	1	4	4	
Bedroom #3	1	1	1	1	4	4	
Bath #1	1	1	1	1	1	1	
Bath #2	1	1	1	1	1	1	
Closets			5	5			
Porch or Terrace			1	1	1 WP	1 WP	
Stairways	1	1	1	1			
Basement	1	1	1	1	1	1	
Garage	1	1	1	1	1	1	
Attic							
Total	31	31	33	33	59	59	

Figure 5.

NEW HOME BUILDING PERMITS

AUGUST - 1957

	Permit Number	Date Issued	Address	Owner	Builder	Electrician	Value	Living Area Sq.Ft.
85	18756	8-1-57	2620 Angelique Street	Clemens Drew	C. & J. Builders		10,000	1540
86	18763	8-7-57	3301 Jackson Street		Paul & Bob Cobb		8,000	952
87	18764	"	3305 Jackson Street		" " "		8,000	952
88	18765	"	3317 Duncan Street		" " "		10,000	1272
89	18768	8-9-57	2804 Castle Lane		Vineyard Construction		11,000	1067
90	18778	8-15-57	508 Antoine Street		Cash Whitman Inc.		7,500	1280
91	18780	"	504 Antoine Street		" " "		7,500	1280
92	18781	"	609 North 5th Street		" " "		7,500	1280
93	18785	8-20-57	3311 Scott Street		Abe Hemoff		8,500	936
94	18786	"	3307 Scott Street		" "		8,500	936
95	18789	"	3113 Doniphan Street	Mr. & Mrs. J. Boyer	Roman Construction		7,500	1284
96	18791	8-21-57	2618 Belle Street		Clifford Kerns		9,500	1260
97	18792	"	2620 Belle Street		" "		9,500	1344
98	18793	"	2622 Belle Street		" "		9,500	1344
99	18794	"	2624 Belle Street		" "		8,500	960
100	18795	"	2613 Belle Street		" "		9,500	1344
101	18796	"	2617 Belle Street		" "		9,500	1344
102	18800	8-22-57	2304 Cedar Street	Jack McCuch			8,500	1200
103	18808	8-26-57	6504 Washington Street	Noah Lashore	Ellis Pennell		8,500	1008
104	18809	"	3409 Shirley Drive		Roy Kasselbuts		7,500	900
105	18810	8-28-57	1356 Buchanan Street	Katherine Harrington	John Schneider		8,000	840
106	18811	8-29-57	205 Ohio Street	John Thomas			8,000	960
107	18811	8-30-57	2901 Stanton Road	John T. Farmer			9,000	1392

Figure 4.

Accounting Conference

(*Continued from page* 388)

again expected to hold their luncheon at noon of the final day, Wednesday, with the program of these committees extending through the afternoon.

The Conference dinner is planned for the second day, Tuesday, April 15, and will include entertainment.

This conference brings together top accountants of the electric and gas utility industries from all over the nation and has attracted more than 1,000 utility accountants in past years. It provides a common meeting ground for accountants from both utility industries to discuss their mutual problems and seek mutual solutions.

The regular Business Machines Exhibit will be displayed at The Shamrock Hilton in conjunction with the Conference. Many manufacturers of office machines will exhibit new equipment and ideas.

Fatal Accidents in the Electric Light and Power Industry

By S. H. Young
The Hartford Electric Light Co.

FATAL accidents in 1956 occurred to 109 employees of electric light and power companies, according to reports made to Edison Electric Institute. Ninety-seven of these 109 fatalities were included in detailed reports. This summary is based on these 97 detailed fatal accident reports.

Electrical shock and burns accounted for 70 of the 97 fatalities. This was 72.1 per cent, or slightly above the 16-year average of 71.1 per cent but considerably lower than the 1956 figure of 77.9 per cent. The low record for the 16 year period was set in 1954 when 62.5 per cent of fatalities was due to electrical shock or burns.

The majority of the fatalities—52—occurred during line work on poles, compared to 62 in 1956. Forty of the accidents were due to contacts made while climbing or in the working position but without cutting out or losing balance. Of these 40 accidents, 16 were caused by hand contacts. Throughout the 16-year record hand contacts have accounted for the largest number of fatal accidents. This can only indicate that rubber gloves still are not being worn in the danger zone. The large number of arm, shoulder and body contacts also would indicate that work is being done without sufficient "covering up" of live equipment and grounds.

In many of the reports it was indicated that accidents occurred while men were working on what they thought to be de-energized lines. The linemen—for their own protection—should have been wearing rubber gloves, although they believed the lines to be de-energized—at least until they had grounded the line and made an appropriate test.

The reports showed that 25 of the electrical shock and burn fatalities were to men between 25 and 30 years of age and that 19 of the 70 fatally

TABLE I—SIXTEEN YEARS OF FATAL ACCIDENTS IN THE ELECTRIC LIGHT AND POWER INDUSTRY
1941 TO 1956 INCLUSIVE

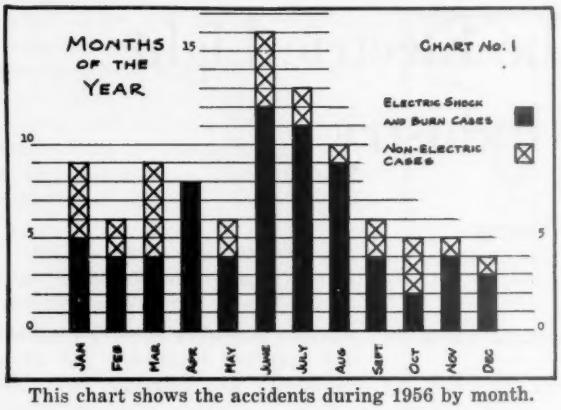
(From EEI Accident Prevention Committee Summaries based on detailed reports received)

Year	Total	Electric Shock or Burn	Falls	Motor Vehicles	Struck by	Burned	Caught in	Drowned	Misc.
1941	121	90	11	8	4	2	3	1	2
1942	121	81	19	11	6	3	0	0	1
1943	117	81	14	3	7	5	1	3	3
1944	82	62	6	5	6	1	2	0	0
1945	116	79	14	6	5	4	3	3	2
1946	105	68	19	8	5	0	2	2	1
1947	173	125	20	8	13	3	2	1	1
1948	149	102	21	13	6	2	2	0	3
1949	176	134	16	13	6	1	5	1	0
1950	141	102	13	9	4	4	0	5	4
1951	165	121	21	8	4	4	1	5	1
1952	125	90	7	17	4	0	1	1	5
1953	134	93	18	12	6	1	0	0	4
1954	120	75	17	14	6	0	2	0	6
1955	122	95	12	0	5	2	1	3	4
1956	97	70	10	6	4	2	2	3	0
16-Year Total	2,064	1,468	238	141	91	34	27	28	37

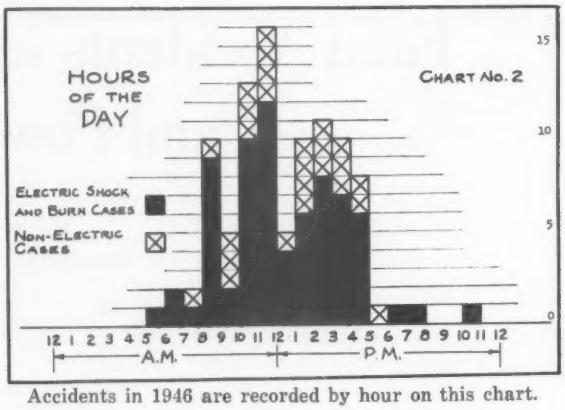
DISTRIBUTION OF ACCIDENT TYPES

(By Percentages of Total Accidents)

	1956	16-Year Average	16-Year Range Minimum	16-Year Range Maximum
Electric Shock or Burn	72.1	71.1	62.5	77.9
Falls	10.3	11.6	5.4	18.1
Motor Vehicles	6.2	6.8	0.0	13.2
Struck By	4.1	4.4	3.1	7.5
Burned	2.1	1.6	0.0	4.3
Caught In	2.1	1.3	0.0	2.8
Drowned	3.1	1.3	0.0	3.5
Miscellaneous	0.0	1.9	0.0	5.0



This chart shows the accidents during 1956 by month.


HOURS OF THE DAY
CHART No. 2
ELECTRIC SHOCK AND BURN CASES
NON-ELECTRIC CASES
15
10
5
0
12 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12
A.M.
P.M.

Accidents in 1946 are recorded by hour on this chart.

injured had been doing this type of work between five and 10 years. The second largest number of such accidents—14—occurred to men 30 to 35 years of age and 14 of those fatally injured had been doing this type of work more than 10 years. Although the reports give no age-level percentages, it is to be assumed that the majority of linemen are between 25 and 30 years of age and the second largest group is between 30 and 35. In the shock or burn category only one accident was reported to men between 20 and 25, none to men under 20 and seven to men more than 50 years of age.

Electrical shock or burn victims at stations increased to 18, three more than in 1956. Five of these fatalities were caused by contact of energized buses and five by contact of energized disconnect switches.

Fatalities due to motor vehicle accidents increased to six, compared with none for 1955. The 16-year average percentage of total accidents attributed to motor vehicles is 6.8. In 1956 the percentage was 6.2. Five of the accidents involved collisions with trains or trucks. The other occurred when a maintenance man possibly went to sleep and ran through a guard rail down a 50-foot bank to a creek.

There were 10 fatalities caused by falls, nine of which involved line work. Two cases were attributed to unfastening safety belts to change positions. The 10 fall cases in 1956 acounted for 10.3 per cent of all accidents, compared to the 16-year average of 11.6 per cent.

There were two non-electric burn cases, or 2.1 per cent of all fatalities, compared to the 16-year average of 1.6 per cent. Two men were caught

(*Text continued on page* 409)

TABLE II—AGE OF MEN

AGE	Number Elec. Shock And Burn	Number Non-Elec.
20 years or less	0	1
20 to 25 years	1	2
25 to 30 years	25	4
30 to 35 years	14	5
35 to 40 years	7	6
40 to 45 years	9	2
45 to 50 years	6	1
Over 50 years	7	5
Age not given	1	1

TABLE III—NUMBER OF YEARS ON THIS TYPE OF WORK

Length of Time	Number of Cases Elec. Shock Or Burn	Number of Cases Non-Elec.
1 month to 6 months	1	2
6 months to 1 year	3	3
1 year to 2 years	10	2
2 years to 3 years	5	1
3 years to 5 years	13	3
5 years to 10 years	19	7
Over 10 years	14	5
Not given	5	4

TABLE IV—ELECTRIC SHOCK AND BURN FATALITIES (1947-56)

		1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	Total
LINE WORK ON POLES	Contacts made while climbing or in working position but without cutting out or losing balance. Hands	32	24	28	25	26	26	14	25	27	16	243
	Arms	10	19	21	14	19	11	11	6	16	8	135
	Head	8	10	7	7	1	7	7	5	5	2	59
	Neck	0	0	0	0	1	0	2	2	2	0	7
	Body	7	7	12	5	4	1	7	4	4	2	53
	Shoulder	0	0	0	0	4	3	4	0	4	4	19
	Leg or Foot	3	1	3	3	1	1	3	1	0	4	20
	Cont. not given	2	3	6	2	5	2	0	0	0	0	20
	Flash	1	0	0	0	2	1	3	3	4	2	16
	Gaff Cutouts	6	2	6	3	5	4	2	0	0	0	28
	Slips & Lost Balance	3	3	2	0	0	0	2	1	3	1	15
	Possible Heart Case	0	0	0	0	0	0	0	0	0	1	1
Line Work from Ladders		4	0	0	1	1	0	0	0	0	0	6
Line Work from Hydr.Tower		0	0	0	0	0	0	0	0	0	1	1
Line Work in Trees		2	0	0	0	0	0	2	1	1	1	7
Line Work on Ground		13	13	15	9	9	10	9	6	2	5	91
Surveying		0	0	0	0	0	2	0	0	1	0	3
Street Light Replacement		0	0	0	0	0	0	0	2	2	0	4
Energ. Cranes & Trucks		0	0	0	0	3	1	2	0	3	4	13
Underground		2	2	2	2	0	2	0	1	6	1	18
In Basements		0	1	0	0	2	0	2	1	0	0	6
Total of Above		93	85	102	71	83	71	70	58	80	52	765
At Stations		32	17	32	31	38	19	23	17	15	18	242
Total		125	102	134	102	121	90	93	75	95	70	1,007

Review and Classification of 97 Fatal Accidents Reported During 1956 Within the Electric Light and Power Industry

Edison Electric Institute Accident Prevention Committee

(This summary was compiled from detailed reports submitted to the Institute)

				PATH OF CURRENT: VICTIM Entry	VICTIM Exit	EQUIPMENT Energized	EQUIPMENT Ground	Voltage	Occupation		DESCRIPTION
ELECTRIC SHOCK OR BURN 52 CASES 70 CASES 72.1%	LINE WORK ON POLES	CONTACTS ESTABLISHED WHILE CLIMBING OR WORKING IN POSITION BUT WITHOUT CUTTING OUT OR LOSING BALANCE	HANDS 16 CASES	R-Hand	Leg	Pri. Wire	Serv. Wire	2400-	App. Lineman	1.	Opened cutout - removed rubber gloves. Reached for X-arm to pull himself up. Touched wire.
				L-Hand	R-Knee	Pole Ground	System Neut.	2300-4160	Lineman	2.	Checking for trouble. Got between system neutral and pole ground which were not tied together.
				R-Hand	L-Foot	Pole Step	Tel. Loop	2400-4160	Lineman	3.	Primary wire hooked onto pole step went unnoticed. Climbed pole and put hand on pole step.
				L-Hand	L-Foot	Pri. Wire	Sec. Neut.	2400-4160	Lineman	4.	Removed rubber gloves to light cigarette. Attempted to remove line hose bare handed.
				L-Hand	R-Foot	Pri. Grd. Lead	Pole Ground	2400-4160	Lineman	5.	Cut trans. primary ground lead using leather gloves. Body in series with pole ground.
				R-Hand	L-Leg	Pri. Wire	Sec. Wire	2400-4160	Lineman	6.	Cutting over series street light wire. Placed hand on primary connector. Not wearing rubber gloves.
				R-Hand	L-Hand	Block Hook	Sec. Wire	-6900	App. Lineman	7.	Replacing transformer. Metal hook on blocks contacted primary wire.
				L-Hand	R-Hand	Trans. Bushing	Hanger Bolt	6900-	Lineman	8.	Disconnecting defective lightning arrestor. Not wearing rubber gloves.
				R-Hand	L-Hand	Trans. Lead	Hanger Bolt	7200-	Serviceman	9.	Injured returned to work on trans. that he had previously cut out but which was later made alive.
				R-Hand	R-Leg	Pri. Wire	Neut. Grd.	7200-12000	Lineman	10.	Clearing trouble on energized circuit man thought dead. Had disconnected wrong jumper.
				L-Hand	R-Heel	Compres. Tool	SL-Mast Arm	7200-12500	Lineman	11.	Completed one press on sleeve with compression tool. Tripped valve with hand.
				L-Hand	Feet	Jumper	Pole	7200-12500	Lineman	12.	Transferring from old to new pole. Contacted work jumper.
				L-Hand	L-Leg	Pri. Wire	Neutral	7200-12800	Lineman	13.	Started to work on line before it had been desmergized.
				L-Hand	Feet	Line Wire	Pole	7620-13000	Lineman	14.	Measuring for jumper with hot sticks. Contacted one end of jumper while other end was still on line.
				R-Hand	R-Foot	Line Wire	Man's Foot	7620-13200	Lineman	15.	Reached up and snapped bag on conductor. Foot in contact with Foreman's foot. Double Fatality.See 36.
				L-Hand	Unknown	Jumper	Unknown	7620-13200	Lineman	16.	Removing hand line after rubber protective equipment had been removed. Made contact.
			ARMS 8 CASES	R-Arm	L-Leg	Trans. Lead	Secondary	240	Lineman	17.	Replacing defective arrestor. No rubber protective equipment or rubber gloves used.
				L-Arm	R-Knee	Dead End	X-Arm Brace	2160-3800	Lineman	18.	Removing rubber protective equipment in wrong sequence. Reached out and made contact.
				R-Arm	L-Heel	Jumper	Sec. Rack	2400-4160	Lineman	19.	Measuring jumper for length. End of jumper contacted arm. Rubber protective equipment in use.
				L-Arm	R-Leg	Loop End	Guy	2400-4160	Lineman	20.	While freeing turned back loop from line, end of loop struck victim.
				L-Elbow	R-Foot	Pri. Wire	Grd. Wire	4800-	Line Foreman	21.	Climbed to top of pole into primary area. No rubber protective equipment or rubber gloves used.
				L-Arm	L-Foot	Pri. Wire	X-Arm Brace	4800-8320	Lineman	22.	Transferring wires on poles. Reached out for come-along. Contacted uncovered wire.
				L-Elbow	R-Forearm	Jumper	Grd. Wire	7200-12000	App. Lineman	23.	Climbed too high on pole. Made contact while belting in.
				L-Arm	R-Foot	X-Arm Brace	Neut. Jumper	7600-13000	Lineman	24.	Without belting in removed hot line clamp man thought dead. Jumper contacted X-Arm brace.
			SHOULDER 4 CASES	R-Shoulder	L-Hand	Dead End	Guy	2400-4000	Crew Foreman	25.	Painting top of steel pole, working between covered wires. Contacted uncovered dead-end clamp.
				Shoulder	L-Knee	Pi Wire End	Guy	2400-4160	Lineman	26.	Climbed to pole top without covering up to cut off dangling primary wire which he contacted.
				L-Shoulder	R-Thigh	Trans. Tank	Sec. Wire	2770-4800	Lineman	27.	Replacing defective transformer. Contacted case while reaching to pull secondary fuse.
				L-Shoulder	L-Wrist	Fuse	Unknown	5000-7200	Lineman	28.	Unbelted to change position. Contacted open fuse. Insufficient rubber protection.
			HEAD 2 CASES	Head	Body	Pri. Wire	Grd. Neut.	2300-4000	App. Lineman	29.	Pulling in new wires. Injured straightened up making head contact on uncovered wire.
				Head	R-Hand	Pri. Cut Out	Trans. Winding	7200-12000	App. Lineman	30.	Checking trans. connection by removing lid. Raised head into primary cutout.
			BODY 2 CASES	Body	R-Foot	X-Arm Brace	Pole Grd.	7200-12470	Lineman	31.	Removing X-Arm. X-Arm brace made contact on hot circuit.
				Back	R-Toe	Line Wire	Guy	21000-36400	Lineman	32.	Preparing to change over junction pole. Climbed into hot circuit before clearance was obtained.
			FOOT 4 CASES	R-Foot	Jaw	St.Lt.Bracket	Tel. Cable	2400-4160	Lineman	33.	In ascending pole stepped on street light bracket alive from cross with primaries.
				R-Foot	R-Arm	Conductor	Dead Wire	4160-7200	Lineman	34.	Standing on buck arm. Gaff pierced line hose on new conductor.
				L-Foot	R-Elbow	X-Arm Brace	Dead Wire	4800-8320	Sub Foreman	35.	Changing from flat to vertical construction. Contacted X-arm brace and dead phase.
				L-Foot	L-Hand	Lineman's Foot	Dead Wire	7620-13200	Line Foreman	36.	Received shock from lineman's foot as described in Accident #15. Double Fatality.
		LOST BALANCE		R-Hand	Body	Pri. Wire	Neut. & Sec.	2400-4160	Lineman	37.	Climbed into position to remove wires after they were cut clear on another pole. Assumed he slipped.
		NO CONTACT -- FLASH BURNS 2 CASES						2770-4800	Lineman	38.	Enveloped in flame upon closing pothead disconnect lug in short on faulty cable.
								2770-4800	Lineman	39.	Same as #38. Double Fatality.
	LINE WORK ON GROUND 9 CASES			Head	Feet	Down Wire	Earth	-240	Lineman	40.	Repairing storm damage. Injured walked into broken wire hanging from pole.
				Arm	R-Hip	Pri. Wire	Guy	2000-4800	Helper	41.	Wire just pulled in wrapped around energized wire. Contact made on new wire.
				Back	Feet	Truck Bed	Earth	-12000	Truck Driver	42.	Wire burned off and fell on line truck energizing it. Injured contacted truck.
				R-Hand	Feet	Truck	Earth	6900-12000	Groundman	43.	Installing pole in span. Boom contacted conductor. Injured attempted to close truck door.
				-	-	Pay Off Reel	Earth	7200-12000	Groundman	44.	Tending pay-off reel wearing rubber gloves. Wire contacted live line. Victim of ground current.
				Head	Feet	Winch Line	Earth	7200-12000	App. Lineman	45.	Truck boom contacted OH wire. Slackened winch line swung against man's head.
				R-Arm	L-Hand	Span Guy	Guy	7960-13800	Groundman	46.	In rowboat attempting to splice temporary guy wire. Strain caused guy to contact live jumper.
				Hands	Feet	Digger Control	Earth	7967-13800	Crew Foreman	47.	Digging pole hole under energized line. Injured at controls raised digger into line.
				Hands	Feet	Pole	Earth	38200-66000	Groundman	48.	Setting pole under energized line. Man handling pole butt when line arced to pole.
	LINE WORK FROM SKY-LIFT TREE TRIMMING MISC.			L-Hand	R-Hand	Messenger	Sec. Cable	2400-4160	Lineman	49.	Working in sky-lift bucket. Messenger contacted pri. wire. Man contacted messenger and sec. wire.
				R-Shoulder	R-Hip	Sec. Wire	Sec. Wire	120-240	Tree Trimmer	50.	Working in tree trimming around lines. Made contact while changing position.
				-	Back of Knee	-	-	120-240	Lineman	51.	Sec. and fire alarm had been shifted. Injured stiffened in belt. Questionable if electric shock.
	UNDERGROUND WORK			Burns from Transformer Explosion				6925-12000	Mechanic	52.	Repacking pri. switch shaft. Compartment exploded. Struck by broken cover and hot askeral.

Review and Classification of 97 Fatal Accidents Reported During 1956 Within the Electric Light and Power Industry

Edison Electric Institute Accident Prevention Committee

(Continued)

			PATH OF CURRENT: VICTIM Entry	VICTIM Exit	EQUIPMENT Energized	EQUIPMENT Ground	Voltage	Occupation	DESCRIPTION
ELECTRIC SHOCK OR BURN CONT.	AT STATIONS ON OR AROUND EQUIPMENT BUS STRUCTURES ETC.	ENERGIZED BUS 5 CASES	Head Hip Head R-Hand R-Arm	Hand & Feet Leg R-Foot L-Hand & Foot L-Hand	Bus Bus Bus Bus Bus	Steel Struct. Ground Wire Steel Frame Trans. Stand Steel Struct.	2400-4160 7000-12000 -13800 8500-15000 -22000	Electrician Elect. Helper Helper Maint. Man Maint. Helper	53. Installing station service. Climbed too high on stepladder. Made contact on bus. 54. Station supposed to be completely de-energized. One switch left closed. Injured sat on live bus. 55. Substation being de-energized. Injured climbed structure to paint. Contacted live bus. 56. Cleaning insulators. Came down from de-energized trans. and climbed up on one still energized. 57. Connecting jumper. Safety strap flipped against bus causing arc which caused man to fall on bus.
		LINES, RISERS LEADS 3 CASES	R-Knee L-Hand	Hands Feet	Jumper OCB Lead Terminal	I Beam Steel Frame OCB Case	2400-4160 2400-4160 38000-66000	Electrician Electrician Supervisor	58. Station partly de-energized for safe work. Injured climbed into hot section to take measurements. 59. Clearance on OCB released - disconnect on one side closed. Contact made while measuring insulator. 60. One side of OCB alive. Climbed on top of OCB to inspect disconnect. Made contact.
		DISCONNECT SWITCHES 6 CASES	R-Hand R-Arm Wrist Hands Hands R-Hand	L-Hand L-Leg Leg Feet Feet Body	Disc. Blade Disc. Switch Disc. Switch Disc. Switch Disc. Switch Disc. Switch	Disc. Blade Steel Struct. Steel Struct. Steel Struct. Steel Struct. Sw.Arcing Horn	2400-4160 2400-4160 -12000 17000-24000 17000-24000 -34500	Operator Lineman Lineman Electrician Foreman Electrician	61. Cleaning and inspecting disconnects. Made contact on energized disconnect in adjacent bay. 62. On step ladder transferring circuit. Blacked out or lost balance and fell into disconnects. 63. Replacing OCB and by-pass switches. Victim closed disconnect to live bus energizing equipment 64. One section of station de-energized to clean and paint. Walked over into section not de-energized. 65. Contacted live by-pass switch in attempting to rescue victim in accident No. 64. Double Fatality. 66. Replacing air-break switch. Made contact when he climbed column next to energized side.
		MISC. EQUIP. 2 CASES	R-Hand R-Hand	Body L-Hand-R-Foot	Fuse Clip Pot Trans.Bush.	Steel Channel Floor	-13200 11600-26000	Crew Foreman Elec. Eng.	67. Climbed steel to replace blown fuse. Reached across fuse - made contact. 68. Checking for oil leak on pot transformer, touched metallic top of pot transformer bushing.
		FAULT CURRENT	Hand	Feet	Switch Handle	Earth	7200-12470	Lineman	69. Pigtail on gang operated switch failed during operation. Ground current fatal to operator.
	18 CASES	FLASH BURNS -	Disconnecting Switch Flashed Over				7000-12000	Electrician	70. While being opened with switch pole disconnects flashed over.
FALLS 10 CASES 10.3%	LINE WORK 9 CASES	FALL FROM POLE OR TOWER 4 CASES			Unbelted To Change Position Unbelted To Change Position Safety Strap Cut By Knife Safety Strap Severed By Winch Line			App. Lineman Lineman Cable Splicer Lineman	71. Transferring services on pole. While changing position, lost balance and fell 20 feet to ground. 72. Apparently injured forgot that he had unbelted. Leaned back and fell 20 feet to ground. 73. Belted in over top arm. While changing position, safety strap cut on knife left in spare pin hole. 74. Raising capacitor bank to arm. Chain-sling holding snatch block at base of pole broke.
		FALL WITH POLE 3 CASES			Pole Broke Off At Ground Pole Broke Off 1 Foot Below Ground Pole Broke Off At Ground			Lineman App. Lineman Lineman	75. Shifting conductors from old to new pole. Pole fell when third wire was cut. Skull fractured. 76. Stripping old pole. Pole fell when last secondary conductor was cut. Neck broken. 77. Pole broke off when secondaries were cut. Rode pole to ground. Head struck pole.
		FALL FROM TREE FALL FROM LADDER			Descending On Loose Line Support Holding Safety Strap Pulled Loose			Trimmer Lineman	78. Life line became entangled. Untied and descended on bull-line end of which was not tied. 79. Installing rack on elevator from ladder. Belted in around temporary studs.
		FALL FROM RETAINING WALL			Stepped Backward Off Edge			Laborer	80. Clearing lumber off roof after installation of glass blocks on hydro-plant wall.
STRUCK BY 4 CASES 4.1%	ROCKSLIDE POLE TRUCK BOOM CRANE BOOM				Carried Into River Removing Pole With Truck Derrick Middle Section Of Boom Collapsed Drum Latch Of Crane Slipped			Mech. Foreman Helper Supervisor Plant Fireman	81. Inspecting efforts to stop water seepage into power house when rockslide occurred. 82. Winch drive mechanism became disengaged due to not being placed in proper position. 83. Setting poles with 10 ton crane. Collapsed due to excessive side strain to straighten pole. 84. Riding crane bucket to roof. Crushed when caught between boom and edge of roof.
DROWNED 3 CASES 3.1%	FLOATING DOCK AT STATION TRASH RACKS AT HYDRO-STATION GENERATING STATION SPILLWAY				Knocked Into River By Steel Cable Riding Trash Rack Rake Fell Off Spillway			Barge Handler Laborer Janitor	85. Rope lashing broke allowing steel cable to whip and knock man in river. 86. Timber in load struck spare rack and fell, knocking man into river. 87. Returning to station via footbridge over discharge canal. How and why he fell not known.
CAUGHT IN 2 CASES 2.1%	AT STATION AT STATION				Crushed In Coal Conveyor Crushed In Coal Conveyor			Yardman Operator	88. Caught between pulley and belt while scraping packed coal off idler pulley with hand scraper. 89. Fell into hopper while punching coal to start its feeding.
MOTOR VEHICLE 6 CASES 6.2%	ON HIGHWAY AT INTERSECTION ON HIGHWAY GRADE LEVEL R.R. CROSSING GRADE LEVEL R.R. CROSSING ON HIGHWAY				Head On Collision Collision At Intersection Head On Collision Collision With Train Collision With Train Ran Off highway			Salesman Salesman Supt. Journeyman Journeyman Maint. Man	90. Collided head-on with semi-trailor coal truck on sharp curve, crowding center of highway. 91. Making left turn off highway. Struck by passing truck. Both trucks ran down embankment. 92. Tractor-trailer jackknifed into adjacent lane in path of victim's car. 93. Failed to observe oncoming passenger train. Crossed in front of train at grade crossing. 94. See #93. DOUBLE FATALITY. 95. Possibly went to sleep and ran through guard rail down 50 foot bank to creek.
BURNED 2 CASES 2.1%	#3 THINNER STEAM				Clothes Caught On Fire Boiler Tube Ruptured			Helper Operator	96. Put 6 quarts thinner in pail to clean spots from clothing. Vapor ignited by electric heater. 97. Working in boiler, tube ruptured. Injured enveloped by steam and hot water.

Compiled for E.E.I. Accident Prevention Committee
By S. M. Young

in coal conveyors and crushed. The percentage for this type of fatality last year was 2.1 per cent, compared to the 16-year average of 1.3 per cent. Three men were drowned, averaging 3.1 per cent of the total fatalities, against a 16-year average of 1.3 per cent.

Again it was shown that more than 50 per cent of all electric shock and burn cases occurred during the four hot weather months—June through September. In 1956 the largest number of fatal accidents took place during June and the least during October. The reports also revealed that more electric shock and burn accidents occur between the hours of 11 a.m. and 12 noon than at any other hour and the second largest number between 10 a.m. and 11 a.m.

Most Non-Electric Cases in March

March was the worst month for non-electric cases and the hours of 11 a.m. to 12 noon and from 1 p.m. to 2 p.m. were the peak non-electric accident periods during the day.

Although it is unfortunate that a more complete description of these fatal accidents and their causes cannot be included in the brief summaries, an observation of the reports indicates that a review of company safety programs is needed.

Many times the statement "Violation of safety rules" was used to explain the cause of the accident. What does this mean?

It means there is something missing in our safety programs. The safety rules and safe work procedures which have been painstakingly developed lose their importance between those who developed them and those who use them.

Where Blame Rests

Common violations include "failure to use rubber gloves in the primary area," and "failure to test for voltage and ground before starting to work." These failures show up in accidents. But the entire blame cannot be placed on those to whom the accident happens. These other contributing factors to accidents are: failure to make sure that our safety rules, safe work procedures and methods are understood by all; failure to insure that all understand why the rules are important, and failure to emphasize the importance of following these rules.

Total fatalities of 1956, as well as electric shock and burn cases, were well behind the three five-year averages since 1941. Based on reports from electric light and power companies, here are comparative figures:

	1956	1951-55	1946-50	1941-45
Total fatalities	97	133.2	148.8	111.4
Electric shock and burn cases	70	94.8	106.2	78.6

Recent EEI Publications

A-C Network Operations 1953-1955

EEI Pub. No. 57-8. A report of the Transmission and Distribution Committee, Edison Electric Institute. 52 pages. Price: $1.00 to EEI member companies; $2.50 to non-member companies in the USA.

This report contains data submitted by 60 companies concerning operations of 424 networks in 160 localities. These data have been tabulated, summarized and compared with the data in the 1950-1952 report. In addition to the text, the report includes summary tables, basic tables and figures. Specifically, the report covers General System and Equipment Characteristics; Network Protectors and Relays; Network Transformers; Secondary Cable Systems; Rubber-Neoprene Cable; Methods of Clearing Cable Faults; Maintenance and Inspection of Transformers and Equipment and Data on Network Trouble and Outages; and Special Instances of Explosions and Sustained Fires.

There are 20 summary tables, eight basic tables and two figures included in the report.

EEI Pocketbook of Electric Industry Statistics

EEI Pub. No. 57-13. 40 pages. Price: 35 cents.

The EEI Pocketbook of Electric Industry Statistics is designed primarily for those who desire to have up-to-date, reliable industry data readily at hand in convenient reference form. Statistics cover selected years from 1902 to date, are national in scope and are from authoritative sources, including EEI publications and studies, Federal Power Commission reports and other government documents. Arrangement of the material has been made with an eye to quick comprehension and only the more significant figures have been included.

Cable Operation 1955

EEI Pub. No. 57-11. A joint report of Committee on Power Distribution, Association of Edison Illuminating Companies, and Transmission and Distribution Committee, Edison Electric Institute. 24 pages. Price: 70 cents to EEI member companies; $1.90 to non-member companies in the USA.

This report covers operating experience with high-voltage (above 7.5 kv between phases) paper-insulated cable, joints and terminations during 1955 as reported by 16 contributing companies which operate 18,367 miles of duct-lay cable.

Gibbs, Lloyd Transposed

In the last issue of the BULLETIN, H. M. Gibbs was inadvertently listed as chairman of the Farm Development Committee and Morris H. Lloyd as chairman of the Farm Promotion Committee. Actually Mr. Gibbs heads the Farm Promotion Committee and Mr. Lloyd heads the Farm Development Committee. Both are committees of the Farm Group in the Commercial Division.

Finer Carolina Anniversary

Nearly 5,000 local improvement projects in more than 100 Carolina towns is the record of Carolina Power & Light Company's Finer Carolina contest, which is celebrating its sixth anniversary.

In surveying the program's progress, E. N. Pope, CP&L advertising manager, pointed out that 118 towns in North and South Carolina are conducting 550 Finer Carolina projects this year under the banner of "helping to build a Finer Carolina." "Their efforts bring the six-year total to 4,450 projects, all of which have benefitted the local community," he said.

Over 90 per cent of Finer Carolina towns have regularly adopted industrial progress projects, to improve diversification and the standard of living in the traditionally farm-textile economy of the CP&L service area. Out of Finer Carolina efforts have grown numerous local industrial development organizations now operating independently.

Electricity on the Modern Academic Scene

By Ruth K. Stroh

WHEN we speak of electricity "on the modern academic scene" we do not just mean the almost miraculous achievements of its presence in the beautiful and purposeful modern school. Certainly it is agreed that without electrical facilities, there would be no such thing as a "modern school."

Electricity plays a more important part on the academic scene—the classroom—in a manner few people realize. Today's children of the "atomic age" may hear and read of atoms and trips to the moon; but they, too, need the understandings and appreciations which lead to a more effective use of the many electrical facilities at their disposal and for their better living.

That electricity in its many phases is a part of every modern school can be seen at a glance into the curriculum of every grade and in the science areas particularly, yet it is equally applicable to all other subjects. Electricity gains a kind of "academic momentum" when it is introduced at the earliest levels of education. Along with proper safety measures, it gradually makes the proper impressions and learnings on the students as they progress through school.

Motivations of Electrical Interest

The approaches or motivations given electricity are many and diversified, often even incidental. That electricity represents the "fast and most efficient way" is one ultimate understanding. That it saves much muscular energy and manpower is evident. There is the desire for the children to engage in electrical activities which tend to make them more observant and learn the ideas sooner.

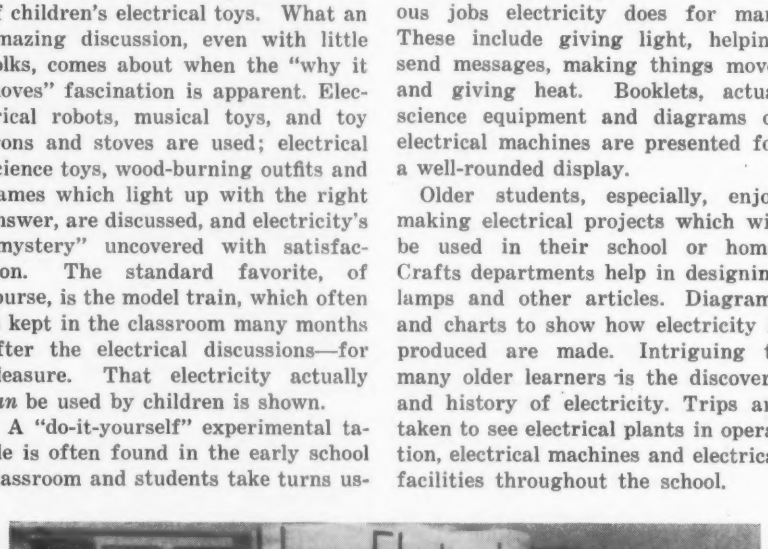
In primary grades, electricity is looked upon as a kind of "hidden genius" or wizard, always waiting to instantly serve man at his will. Children will grasp this at a young age if given opportunities in school to use the electricity at hand. If popcorn is made for a party, electricity is on hand to do the job. If more light is needed, a button is pushed. Electricity enables them to have films, telecasts, and fluorescent lighting.

Christmas time especially provides an opportunity to observe what electricity can do, especially in the area of children's electrical toys. What an amazing discussion, even with little folks, comes about when the "why it moves" fascination is apparent. Electrical robots, musical toys, and toy irons and stoves are used; electrical science toys, wood-burning outfits and games which light up with the right answer, are discussed, and electricity's "mystery" uncovered with satisfaction. The standard favorite, of course, is the model train, which often is kept in the classroom many months after the electrical discussions—for pleasure. That electricity actually *can* be used by children is shown.

A "do-it-yourself" experimental table is often found in the early school classroom and students take turns using such equipment as batteries, bells, magnets, small motors, and other simple electrical devices for themselves. They lose fear of the "unknown" and learn safety habits, too. With the guidance of an alert instructor who shows her appreciation of electricity, they gain quickly an insight into the world of electricity.

Lists are made by students to summarize their electrical learnings. Some center on such subjects as "Ways Electricity Helps in Our School"; "Electricity on the Farm"; "Electricity Helps me Have Fun"; "Electricity Does Work for Us"; "Electricity Saves Time, Effort, Money!" Bulletin board displays offer a chance to group magazine pictures into various jobs electricity does for man. These include giving light, helping send messages, making things move, and giving heat. Booklets, actual science equipment and diagrams of electrical machines are presented for a well-rounded display.

Older students, especially, enjoy making electrical projects which will be used in their school or home. Crafts departments help in designing lamps and other articles. Diagrams and charts to show how electricity is produced are made. Intriguing to many older learners is the discovery and history of electricity. Trips are taken to see electrical plants in operation, electrical machines and electrical facilities throughout the school.



Displays showing uses of electricity are developed by grade school children.

Miss Stroh has been a teacher in Maryland elementary schools for six years.

Heating and cooling equipment, fans, and other on-the-spot in-school demonstrations seem the most impressionable to the child. Spreading debris on a carpet, then showing the comparison of cleaning it by broom, and by electrical cleaner, are vivid illustrations to youngsters, and show the value of electricity. Lists of electrical apparatus are almost endless, and include the mixer, refrigerator, lamp, beater, toaster, heating pad, stove, washing machine, etc.

Most important is letting the child participate actively in any experiments or projects undertaken. The "don't touch" attitude is replaced with positive, safe outlooks on the electrical scene.

Electricity seems to transcend the entire school curriculum. Electricity in the world of communication, in the world of transportation and in the world of business receives attention at various levels, each time becoming more meaningful to the students. Once electricity was a neglected topic and used only in instructor's demonstrations. But students now engage in electrical projects of all kinds and learn by doing.

It is close to impossible to expect children of the atomic age to try to visualize what the world was like without electricity. Films, books, charts, stories, and historical accounts of inventors serve to promote some of the major ideas. Speakers from the fields of electricity, electronics, television, radio, and others are often engaged. Pamphlets from electrical companies and electrical manufacturers help immeasurably to put across essential ideas on the subject. The best in-school approach to electrical ideas and appreciations includes a wide variety of these activities, and perhaps one phase will receive intensive studying. Relating electricity to the everyday life of children holds the greatest potential for its teachings.

No one will deny that the best "consumer" and "electricity-user" is the one who is educated and appreciative. Thus electricity as an interesting, vital subject on the academic scene, is justified. And, who knows? It may serve to produce some men and women who will serve the field in the future. Electricity is getting its deserved attention on the modern school scene.

Second Live Better Electrically Women's Conference Jan. 9-11

"How to Tell the Story of Electrical Living" is the theme of the second annual Live Better Electrically Women's Conference, sponsored by the EEI Home Service Committee and to be held at the Edgewater Beach Hotel, Chicago, Jan. 9-11.

In addition to the regular business and social activities, the conference will feature a visit to appliance displays at Chicago's markets. Miss Elizabeth Parker, home service director, Georgia Power Co., is chairman of the sponsoring EEI Home Service Committee. The program is:

Thursday a.m., Jan. 9

"See the Whole Picture," will be discussed by R. L. Coe, residential sales manager, Union Electric Co., St. Louis; "Improve Your Communications," a panel discussion follows, with Esther Foley, home service director, McFadden Publications, as moderator. Internal communications will be discussed by Mrs. Ruth Phillips Steinhauser, director of public relations, Community Public Service Co., Fort Worth; external communications—newspaper copy, Ruth Ellen Church, food editor, *The Chicago Tribune;* radio, Jessie E. Heathman, assistant extension editor, Cooperative Extension Work in Agriculture and Home Economics, Urbana, Ill.; television, Fran Allison, television star, Chicago; slides and films, Mrs. Elizabeth McD. Thomas, home economics director, Pennsylvania Electric Co., Johnstown, Pa., and Metropolitan Edison Co., Reading, Pa.

The luncheon speaker will be Edwin Vennard, vice president and managing director of EEI.

Thursday p.m., Jan. 9

"Dramatize Your Technique" will feature the afternoon discussions, with Mary E. Huck, director of home economics, Frigidaire division, General Motors Corp., using as her subject "Perfect Your Technique." On the utilization of new products, Mrs. Katherine R. Smith, director of consumer service division, National Canners Association, Washington, D. C., will cover canned meats; Esther Latzke, director of consumer service department, Armour and Co., Chicago, meats; Dr. J. G. Woodroof, chairman of food processing division, Georgia Experiment Station, frozen foods; and Anne Lyng, associate editor, of home economics department, Procter & Gamble Co., soaps and detergents.

Friday a.m., Jan. 10

The program for Friday morning includes: E. J. Hurley, director of residential and rural sales, The Detroit Edison Co., "Meet the Maestro"; a panel discussion, "Appeal to Your Appliance Prospects," moderated by Mrs. Julia Kiene, consultant, *Capper's Farmer* magazine, who also will discuss farm prospects. Metropolitan prospects will be discussed by Mrs. Marguerite Fenner, director of home economics, Pacific Gas and Electric Co., San Francisco; suburban prospects by Glenna McGinnis, food and equipment editor, *Woman's Day* magazine; and small town prospects by Mrs. Maxine Livingston, family home editor of *Parents* magazine.

Myrtle Fahsbender, director of residential lighting, Westinghouse Electric Corp., will use as her theme "Set a Good Example."

"The Manufacturer's Viewpoint" is the subject to be used by Dwight R. Anneaux, general sales manager, special markets, Whirlpool-Seeger Corp.

The luncheon speaker will be Mrs. Sigana Earle, director of food and homemaking education, *Seventeen.*

Friday p.m., Jan. 10

Success Stories — HOUSEPOWER, Dealer Promotions, Live Better . . . Electrically, Medallion Home Program by a Woman Builder, Lighting, Attendance Promotions, Small Appliances will be discussed.

"What Will You Do with All This?" is the question to be posed by Helen Kirtland, consultant, women's interest, Live Better . . . Electrically.

The last speaker Friday afternoon, T. O. McQuiston, vice president, Metropolitan Edison Co., will use as his subject "Face Your Challenge."

Saturday a.m., Jan. 11

Willie Mae Rogers, director, The Institute, *Good Housekeeping* magazine, will speak Saturday at luncheon.

EEI PUBLICATIONS AND SERVICE MATERIAL

A more detailed Publication Catalog available upon request.

(Prices include transportation in U. S. only. Please order by number shown before title. Standing Orders may be placed for a specified number of copies of reports of various committees as issued, to be shipped to one address.)

Payable in United States Currency—Postage Stamps Not Acceptable

Accounting and Statistical

	Members	Non-Members
Accounting Conference Proceedings (Bound Volume) 1957	$5.00	$7.50
Previous Years Available.		
Internal Auditing Procedure Manual.	6.00	7.00
51-23—Methods of Estimating Utility Plant Life, 1951	1.50	3.75
Accounting Development Service	$2.50	yearly

Series of periodic bulletins issued about every 3 months—describing new methods, procedures, machines, equipment, etc., of interest to electric and gas accountants; selected by specially appointed Committee.

Statistical

57-2—Electric Light and Power Industry, 1956 (1957)	1.25	1.25
56-2—Electric Light and Power, Industry, 1955 (1956)	1.00	1.00
55-2—Electric Light and Power Industry, 1954 (1955)	1.00	1.00
54-2—Electric Light and Power Industry, 1953 (1954)	1.00	1.00
53-2—Electric Light and Power Industry, 1952 (1953)	1.00	1.00
52-2—Electric Light and Power Industry, 1951 (1952)	1.00	1.00
(Statistical Bulletins also available for years 1948-1951 (inclusive) each	.75	.75
Weekly, Monthly and Annual Statistics (Includes Annual Statistical Bulletin; Weekly Electrical Power Output; Monthly Electrical Research Statistics)	2.00	2.00

Engineering Committees

ACCIDENT PREVENTION—RESUSCITATION

*100-499 copies 15% discount, 500 or more copies 25% discount.

57-12—Electrical Workers' Protective Equipment Current Practices, 1957	2.00	2.00
55-1—Hot Line Tool Guide	.25	.25*
54-4—Place of Safety in Selection and Training of Employees	.25	.65
51-8—"By the Grace of God," 1951	.25	.25*
P-9—Application and Care of Rubber Protective Equipment, 1948	.25	.25*
M-10—Fifteen Messages on Accident Prevention in Electric Utilities	.10	.10
L-4—Linemen Cutouts (2/45)	.10	
K-8—Pole Top Resuscitation (9/43)	.10	
(Quantity Prices on Application)		

ELECTRICAL SYSTEM AND EQUIPMENT COMMITTEE

57-4—Survey of Electric Utility System Planning Practices, 1957	1.25	3.15
57-3—Electric System Load Forecasting, 1957	.70	1.75
55-19—Substation Loading by Thermal Capability	.60	1.50
M-3—Principles of System Relaying (1945)	.60	1.50

HYDRAULIC POWER COMMITTEE

55-9—Hydraulic Turbine and Draft Tube Settings	.40	1.00
52-14—Pitting Experiences of Hydraulic Turbines	.60	1.50

JOINT REPORTS

	Members	Non-Members
57-9—Time-Current Characteristics of Branch Circuit Protective Devices, 1957	.25	.25
57-7—Standards for Secondary Network Transformers Subway-Vault Types (Liquid-Immersed) 1st Report, EEI-NEMA, 1957	.80	.80
55-14—Standards for Distribution Transformers, Overhead Type, 6th Report, EEI-NEMA, 1956	1.20	1.20
55-8—Polyphase Motor Starting Current Rules, AEIC, EEI, NEMA, 1955	.25	.25
51-19—Joint Use of Poles in Rural Areas, EEI-Bell Systems, 1951	No charge	
51-16—Inductive Coordination Aspects of Power Factor Correction Capacitor Installations — Engineering Report No. 50 — Joint Subcommittee on Development & Research — EEI and Bell Telephone System—1951	.80	2.00
51-3—Recommended Standards for Distribution Transformers, Conventional Subway Type—1st Report, EEI-NEMA, 1951	.60	.60
R-9—Branch Circuit Overcurrent Protection for Low-Voltage Circuits of 50 Amperes or Less Used for Interior Wiring—Report of Joint Committee on Branch Circuit Protection of AEIC & EEI, 1949	1.00	1.00
R-6—Preferred Voltage Ratings for A-C Systems & Equipment, EEI-NEMA (1949). Send orders to American Standards Association	.70	.90
Q-8—Single - Phase Motor Starting Current Rules, EEI-NEMA-AEIC, 1948	.25	.25
Q-4—Guide for Specification on Indoor Metalclad Switchgear, AEIC-EEI-NEMA, 1948	.25	.25
P-1—Mutual Assistance in General Emergency Situations Affecting both Power & Telephone Service — Report of Joint Subcommittee on Cooperation in Emergencies, EEI and Bell Telephone System	No charge	
O-12—Report of Joint Engineering Committee of Association of American Railroads & EEI on Crossings of Electrical Supply Lines and Facilities of Steam and Electrified Railroads (8/46)	.50	
Quantities of 25 or more	.40	
O-11—Mutual Practices Applying to Installation and Maintenance of Equipment Used in Providing Telephone Service by Power Line Carrier in Rural Areas (For Field Trial)—Report of Joint Committee on Plant Coordination of EEI and Bell Telephone System	No charge	
M-12—Joint Pole Practices for Supply and Communication Circuits—EEI-Bell Telephone (1945)	.50	1.25
M-9 — New Developments in Office Machines — Joint AGA-EEI Customer Accounting Committee Report	.50	.50
M-5—Principles and Practices for Inductive Coordination, Allocation of Costs and Joint Use of Poles—EEI-Bell Telephone (1945)	No charge	
L-5—Interim Report of The American Research Committee on Grounding (1/44)	.10	
K-1—Volume 5 of Engineering Reports Nos. 39 to 49 of Joint Subcommittee on Development and Research (1/43)	5.00	10.00

METER & SERVICE COMMITTEE

56-7—Recommended Safety Practices for Electrical Metermen, 1956	.25	.25
100-499 copies 15% discount		
500 or more copies 25% discount		

PRIME MOVERS COMMITTEE

	Members	Non-Members
55-22—Boilers & Combustion, 1955	.75	1.90
55-21—Instruments and Controls Practices for Recent Single Boiler Turbine Reheat Installations	.80	2.00
54-17—Blowing Out Main Turbine Steam Lines before Initial Operation, 1954	.40	1.00
54-15 Turbine Operating and Outage Data Report, 1953 (1954)	.40	1.00
54-6—Turbine Operating and Outage Data Report, 1952 (1954)	.40	1.00
53-10—Turbine Operating and Outage Data for 1951, 1953	.40	1.00
52-13—Metallurgy and Piping Report, 1952	.80	2.00
52-5—Turbines, Condensers and Auxiliaries, Feed-water Heaters, Evaporators, and Deaerators, 1950 (1952)	1.40	3.50
51-9—Power Station Chemistry, 1951.	.50	1.25
51-5—Turbines, Condensers & Auxiliaries, Feedwater Heaters, Evaporators & Deaerators, 1949 (1951)	1.20	3.00
51-1—Gas Turbines, 1951	.20	.50
50-13—Deposits on Gas Side of Steam Generating Units, 1951	.30	.75
50-10—Metallurgy and Piping Report, 1950	.90	2.25
50-1—Turbine & Condensers and Associated Equipment, 1948 (1950)	1.00	2.50
R-13—Turbine and Boiler Overhaul Practice (1949)	.50	1.25
R-8—Boiler Auxiliaries, 1948	.30	.75
R-7—Metallurgy and Piping, 1948	.60	1.50
R-3—Turbines, Condensers & Auxiliaries, Feedwater Heaters & Evaporators, 1946-47 (1949)	1.40	3.50
R-1—Boilers & Combustion, 1948 (1949)	1.00	2.50
P-10—Boiler Auxiliaries, 1946-1947	.70	1.75
P-8—Turbines, Condensers, and Their Auxiliaries, 1945-1946	1.00	2.50
P-4—Metallurgy and Piping, 1947 (9/47)	.60	1.50
O-13—Boilers and Combustion, 1946	1.00	2.50
M-6—Boiler Auxiliaries, 1944-45	.70	1.75

TRANSMISSION AND DISTRIBUTION COMMITTEE

57-11—Cable Operation, 1955 (1957)	.70	1.90
57-8—A-C Networks Operations, 1953-1955 (1957)	1.00	2.50
57-5—Guide for Loading Network Protectors, 1957	.25	.25
56-8—Cable Operation, 1954 (1956)	.70	1.75
55-10—Cable Operation, 1953 (1955)	.70	1.75
54-8—Cable Operation, 1952 (1954)	.70	1.75
54-5—A-C Network Operations, 1950-52	.75	1.90
53-16—Cable Operation Report, 1951	.70	1.75
52-10—Cable Operation Report, 1950 (1952)	.70	1.75
52-6—Cable Operation Report, 1949 (1952)	.70	1.75
51-10—Cable Operation Report, 1948 (1951)	.70	1.75
51-6—A-C Network Operations, 1947-1949 (1951)	.65	1.65
50-3—Cable Operation, 1947 (1950)	.75	1.75
Q-12—A-C Network Operations, 1944-1946 (1949)	.60	1.50
Q-10—Cable Operation Report, 1946	.75	1.75
Q-1—Cable Operation Report, 1945	.75	1.75
K-10—Line Clearing Manual, 1944	1-9 copies	35c.

SUGGESTIONS FOR SPECIFICATIONS

10 to 49 copies, 25% discount
50 or more copies, 50% discount

AP-1—Specifications for Electrical Workers Insulating Safety Headgear, 1954	.25	.25
AP-2—Specifications for Electrical Workers' Insulating Safety Headgear, 1957	1-10 copies	.35
	11-49 copies	.30
	50 or over	.25
MS-1—Suggestions for Specifications for Standard Dial Constants for Alternating Current Watthour Meters (8/40)	.10	.10
MSJ-3—Standards for Metering Current Transformers for Primary Circuits, AEIC-EEI-NEMA, 1951	.10	.10
MSJ-4—Standards for Indicating Demand Registers, AEIC-EEI-NEMA, 1952	.50	.50
MS-5—Specifications for Indicating Thermal Watt Demand Meters, 1946	.10	.10
MS-6—Specifications for Marking and Arrangement of Terminals for Phase-Shifting Devices Used in Metering, 1946	.10	.10
MSJ-7—Standards for Watthour Meter Sockets, AEIC-EEI-NEMA, 1950	1.25	1.25
MSJ-8—Standards for Test Blocks and Cabinets for Installation of Self-Contained "A" Base Watthour, Meters, AEIC-EEI-NEMA, 1951	.50	.50
MS-9—Specifications for Test Switches for Transformer Rated Meters, 1954	.25	.25
TD-1—Specifications for Steel Bolts and Nuts, 1949	.10	.10
TD-2—Specifications for Strand Eye Anchor Rods 1956	.10	.10
TD-3—Specifications for Lag Screws, 1950	.10	.10
TD-4—Suggestions for Specifications for Eye Bolts	.10	.10
TD-5—Specifications for Eyenuts and Eyelets, 1955	.15	.15
TD-6—Specifications for Steel Crossarm Braces (1957)	.15	.15
TD-7—Specifications for Spool Type Secondary Racks 1948	.10	.10
TD-8—Suggestions for Specifications for Straight Tinned Copper Connectors 1940	.10	.10
TD-9—Specifications for Single Tube Seamless Copper Splicing Sleeves 1942	.10	.10
TD-10—Specifications for Rolled Steel Washers, 1953	.10	.10
TD-11—Specifications for Guy Hooks and Guy Strain Plates, 1951	.10	.10
TD-12—Specifications for Pole Guards, 1946	.10	.10
TD-14—Specifications for Moulding Staples, 1954	.15	.15
TD-15—Specifications for Pole and Lower Steps, 1946	.10	.10
TD-16—Line Hardware Materials Inspection Procedure, 1950	.10	.10
TD-17—Specifications for Bolt Type Steel Insulator Pins with One Inch Diameter Lead Threads, 1947	.10	.10
TDJ-19—Standard Mounting Bracket for Distribution Cutouts and Dis-		

	Members	Non-Members
tribution Lightning Arresters, 1949	.10	.10
TD-21—Specifications for Steel Clevises for Guy Strain Insulators, 1952	.10	.10
TD-22—Specifications for Pole Top Pins, 1951	10.	.10
TD-23—Specifications for Guy Clamps, 1951	.10	.10
TD-51—Specifications for Low and Medium Voltage Pin Type Lime-Glass Insulators 1942	.25	.25
TDJ-52—Standards for Wet-Process Porcelain Insulators — Suspension Type, EEI-NEMA, 1952	.25	.25
TDJ-53—Standards for Wet-Process Porcelain Insulators — Spool Type, EEI-NEMA, 1952	.25	.25
TDJ-54—Standards for Wet-Process Porcelain Insulators — Strain Type, EEI-NEMA, 1952	.25	.25
TDJ-55—Standards for Wet-Process Porcelain Insulators—Low-and-Medium Voltage Pin Type, EEI-NEMA, 1952	.25	.25
TDJ-56—Standards for Wet-Process Porcelain Insulators — High-Voltage Pin Type, EEI-NEMA, 1952	.25	.25
TDJ-57—Standards for Wet-Process Porcelain Insulators—High-Voltage Line-Post Type, EEI-NEMA, 1952	.25	.25
TDJ-58—Standards for Wet-Process Porcelain Insulators (Apparatus-Cap & Pin Type), 1956	.30	.30
TDJ-59—Standards for Wet-Process Porcelain Insulators (Apparatus-Post Type), 1956	.30	.30
TD-71—Suggestions for Specifications for Insulator and Pin Threads and Gauges, 1937	.10	.10
TD-72—Tentative Specifications for Line Connectors and Splices 1949	.10	.10
TD-90—Specifications for Douglas Fir Crossarm Treated or Untreated, 1949	.10	.10
TD-91—Specifications for Dense Southern Pine Crossarms, Preservative Treated, 1957	.30	.30
TD-92—Specifications for Heavy Duty Douglas Fir Crossarms, 1957	.25	.25
TD-93—Specifications for Heavy Duty Douglas Fir Braces, 1957	.25	.25
TD-100—Specifications for Full-Length Non-Pressure Preservative Treatments of Poles (Hot and Cold Submersion Processes), 1952	.25	.25
TDJ-110—Standards for Distribution Fuse Links, EEI-NEMA, 1951	.15	.15
TDJ-131 — Standards for Filament Lamps Used in Street and Highway Lighting, EEI-NEMA, 1951	.10	.10
TDJ-132—Standards for Photometric Tests for Luminaries Used in Street and Highway Lighting, EEI-NEMA, 1951	.10	.10
TDJ-133—Standards for Voltage Classification of Luminaires Used in Street and Highway Lighting, EEI-NEMA, 1951	.10	.10
TDJ-134 — Standards for Pendant Luminaire Mounting Used in Street and Highway Lighting, EEI-NEMA, 1951	.10	.10
TDJ-135—Standards for Street Lighting Poles Used in Street and Highway Lighting, EEI-NEMA, 1953	.30	.30
TDJ-136—Standards for Series Sockets and Series-Sockets Receptacles Used in Street and Highway Lighting, EEI-NEMA, 1951	.10	.10
TDJ-137—Standards for Steel Luminaire Supports for Wood Poles Used in Street & Highway Lighting, EEI-NEMA, 1956	.25	.25
TDJ-138—Standards for Film Cutouts Used in Street & Highway Lighting, EEI-NEMA, 1956	.15	.15
TDJ-139—Standards for Materials, Finishes and Performance Tests for Equipment, EEI-NEMA, 1953	.20	.20
TDJ-140—Standards for Metal Head and Reflector Interchangeability, EEI-NEMA, 1956	.25	.25
TDJ-141—Standards for Insulator Head and Reflector Interchangeability Used in Street & Highway Lighting, EEI-NEMA, 1956	.25	.25
TDJ-142—Standards for Open Reflector Mountings Used in Street and Highway Lighting, 1953	.20	.20
TD-160—Specifications for Solder Sweated Split Tinned Copper Connectors, 1955	.25	.25

Commercial Division Reports and Manuals

*Quantity Prices Upon Request
† 10% Additional for Non-Members

Farm Electrification	Members	Non-Members
"Farm Better Electrically" Program Materials	Information Supplied on Request	
56-15—Farm Electrification Research, 3rd Edition, 1956	1.25	1.25*
56-14—Electrical Projects for Farm Youths, 1956	1.25	2.00
56-13—Agricultural Development Programs Pay	.25	.25*
Farm Electrification Lesson Plans for Vocational Agriculture Teachers, 1955	.50	.50
53-19—Electrical Projects for Farm Youths, 1953	1.50	2.50
53-18—Ideas for Farm Displays, 1953	1.00	2.50
53-15—What Electric Companies Are Doing in Farm Betterment Programs, 1953	1.00	1.00
53-14—Practical Farm Wiring Demonstrations, 1953	1 to 49 copies .50 ea *	
50-8—Farm Electrical Equipment Handbook, 1951	2.25	2.25*
Farm Lighting Slide Kit—20 black & white 2 x 2 slides and scripts	Single kits $5.00 *†	
Farm Electrification Speakers' Slide Kit on Electrical Safety & Maintenance on the Farm—57 Kodachrome Slides and Speakers' Scripts	Single kits $12.00 *†	
"Light for Seeing on the Farm" (E-400) well-illustrated 14 pg booklet emphasizing importance of lighting (min order 100)	100-199 copies .05 ea *†	
"Plan for Action"—suggestions for conducting farm lighting promotion activity and source list of lighting promotional materials	.25†	
Farm Electrification Manual, includes and binder—prices available upon request.	17 Sections	
General		
56-12—Heat Pump Data Sheets on Residential and Commercial Installations	2.00	3.00
56-3—Listing of Manufacturers of Principal Types Electric Space Heating Equipment, 1956	.25	.50
55-6—Current Status of Commercial Heat Pump Promotion by Electric Utilities	.25	.50
53-5—Study to Determine the Load and Revenue Potential of Apparel Stores, 1953	.50	.50
52-11—Application of Electrical Equipment in Commercial Establishments, Revised, 1955	1.00	2.50*
51-15—Study to Determine Load and Revenue Potential of American Food Markets, 1951	.25	.25
P-6—The Heat Pump, 1947	.25	.25
Lighting		
57-10—Summary of Mercury-Fluorescent Street Luminaire Survey	.50	.50
56-12—Heat Pump Data Sheets on Res. & Coml. Installations, 1956	2.00	3.00
56-11—Catalogue of Lighting Demonstration and Exhibit Materials	1.00	1.50
55-4—Summary of Preliminary Questionnaire on Mercury Fluorescent Lamps Used for Street and Highway Lighting	.50	.50
54-14—Commercial Lighting Sales Organization Manual, 1954	1.00	1.50
Power		
I-1—Power Sales Manual, Volumes I and II Includes two binders and tabs—Prices Available upon request.		
Water Heating		
55-12—Tips on Elec Water Heater Installations, 1955 (min order 100)	Single copies .15 ea *†	
51-12—Study to Determine Load and Revenue of Water Heater Market, 1951	.25	.25
Wiring		
56-4—Commercial Wiring Modernization, 1956	1.00	1.00*
55-13—Tips on Room Air Conditioners and Attic Fan Installation, 1955 (min order 100)	Single copies .20 ea *†	
55-7—Farmstead Wiring Handbook, 1955	Single copies .50 ea *	
54-13—Residential Wiring Handbook, 1954	Single copies .25 ea *	

NATIONAL PROGRAMS

Better Light Better Sight Bureau

"Teaching About Light and Sight"—Classroom program for teaching about light and sight in 5th and 6th grades. Price list on request.

"Living With Light" — Classroom program for teaching about light and sight in Junior High School Science classes. Price list on request.

"Lighting for Better Living"—Program for teaching about light and sight in Home Economics classes, 4-H Clubs and Extension Groups. Price list on request.

"Working with Light"—program of supplementary study materials for use in Industrial Arts and Vocational Education classes, adult education and 4-H groups. Price list upon request.

"Light Is What You Make It"—A sound movie in Technicolor produced by Walt Disney Productions, 16 mm, 10 min. $100 per print.

"Light, An Aid to Sight" (B-562) 8-pg, 2-color, pocket-size folder on home lighting for consumer distribution—$2.00 per 100, $15 per 1000 FOB N Y*

"How to Make Homework Lighter" (B-563) 8-pg, 2-color booklet on lighting for home study; for consumer distribution—$4.00 per 100, $35 per 1000 FOB N Y*

"Eyes, our Windows to the World" (B-564) 24-pg booklet on lighting and science of seeing—$6.75 per 100, $60 per 1000 FOB N Y*

*Minimum order 100

Sales Training Program

Appliance Sales Training Course—6 Films and Records	250.00
Set of 6 Salesmen's Manuals for above course	4.50
Industrial Sales Training Handbook	18.50

HOUSEPOWER Program

HOUSEPOWER Forum on Residential Wiring Modernization (Sales Training)	$250.00
Set of 7 booklets and binders for above	1.75
Visual Presentation for Wiring Salesmen	3.50

Promotional Materials—write for latest information.

OTHER PROMOTIONAL MATERIALS

A detailed Publications Catalog is available upon request to the Commercial Department of the Institute. This Catalog contains information on many Commercial materials, including—

Commercial Cooking, Water Heating and Planned Lighting, Industrial and Residential Promotional Materials, Sales Personnel and Training Materials.

Samples will be supplied on request.

Miscellaneous Publications

*Quantity prices upon request.

	Members	Non-Members
57-15 — 22nd Semi-Annual Electric Power Survey, 1957	1.00	1.00
57-14—Electric Power from the Atom —1957 Edition	*.25	*.25
57-13—Pocketbook of Electric Industry Statistics, 1957	*.35	*.35
57-1—1956 Year-End Summary of Electric Power Situation	.50	.50
56-9—Glossary of Electrical Terms	.50*	.50*
56-6—I Want to Know About the Electric Industry, 1957 Edition	Single copies gratis Quantity prices upon request	
55-16—Underground Systems Reference Book, 1957	11.50*	12.50*
54-3—Protection of Industrial Land, Method and Results, Report of Ind. Development Subcommittee, Area Development Committee, 1954	.40	1.00
53-6—Area Development Suggestions, #3, 1953	.30	.75
53-4—Bibliography of Heat Pump, Through 1951	1.00	1.00
52-17—Area Development Suggestions, Number 2	.25	.40
52-12—Area Development Suggestions #1, 1952	.40	1.00
51-18—Specifications for Impregnated Paper Insulated Cable, High Pressure Pipe Type—1st Edition, AEIC, 1951	Single Copy	1.00*
51-4—Specifications for Impregnated Paper Insulated Lead-Covered Cable Oil-Filled Type, AEIC, 1951	Single Copy	1.00*
50-7—Specifications for Alternating-Current Power Circuit Breakers (2nd Edition), AEIC, 1950	.60	.60
R-17—Specifications for Impregnated Paper-Insulated, Lead-Covered Cable, "Solid" Type (8th Edition) AEIC, 1949	1.00	1.00
R-12—Electrical Meterman's Handbook —6th Edition—1950	Single copy 3.30	4.90*
Q-11—Suggested Field Test Procedure for Determination of Coefficient of Performance Factor of an Electric Heat Pump While Operating on Heating Cycle, 1948	.25	.25
Q-5—Specifications for Impregnated Paper-Insulated, Lead-Covered Cable, "Low Pressure, Gas-Filled" Type—AEIC, 1948	Single copies 1.00 10 or more copies .85	
Rate Book for 1957	20.00	30.00

Periodicals

Better Light Better Sight News (6 issues yearly)	1.00	1.00
Edison Electric Institute Bulletin (Monthly)	2.00	2.00
Farm Electrification (a bi-monthly publication) Up to 5 copies	Free To Mem.	
Over 5 copies per year	1.00	1.50
	Quantity prices upon request.	
Home Service Exchange Yearly subscription	1.00	1.50
	One free copy to members upon request.	

Personals

Chas. E. Oakes, president of Pennsylvania Power & Light Co., on Dec. 1 was elected board chairman of the company and **Jack K. Busby,** executive vice president, succeeded Mr. Oakes as president. A former EEI president, Mr. Oakes continues as PP&L's chief executive officer.

CHAS. E. OAKES

JACK K. BUSBY

The new board chairman first joined PP&L nearly 35 years ago as an engineer in the rate department. He was appointed assistant to the president in 1925 and then manager of the former Allentown division. He next moved to Birmingham, Ala., as president of the Birmingham Electric Co. In 1945 he returned to Allentown as president of PP&L. Through his term as president, these increases in the utility have been achieved: customers, from 439,000 to 700,000; total utility plant, from $206 million in 1946 to more than $550 million at the end of 1956; electric station capability, from 448,000 kw to more than 1,300,000 kw. Since Mr. Oakes has been president of the utility, a number of important mergers have been effected, the most important of which were the Pennsylvania Water & Power Co. and the Scranton Electric Co.

Mr. Oakes, who was EEI president in 1947-48, was president of the Pennsylvania Electric Association in 1946-47. A board member of several Pennsylvania companies, he is active in civic groups, trade associations, clubs and societies. He is a member of the EEI board of directors, a member of the Executive Committee, the Association of Edison Illuminating Companies, and a director and member of the Executive Committee, the National Association of Electric Companies. Mr. Oakes was graduated from Oregon State College in 1915 with a bachelor of science degree and in 1917 he received a masters degree in mechanical engineering from Cornell University.

Mr. Busby joined PP&L in 1951 as general counsel. In 1954 he was appointed vice president and general counsel.

In 1956 he was appointed executive vice president and elected a company director.

He was graduated from Princeton University, magna cum laude in 1938, and from Yale Law School in 1941. Except for wartime service as a lieutenant in the U. S. Navy, Mr. Busby was associated with the law firm of Simpson Thatcher & Bartlett of New York City, before he joined Pennsylvania Power & Light Co. six years ago.

Mr. Busby is a director of the West Pittston and Exeter Railroad Co. and a member of the board of governors of the Lehigh Country Club. He is a member of a large number of civic, social and business organizations.

Ernest S. Fields, vice president and general manager of The Cincinnati Gas & Electric Co., has been elected president, and **William H. Zimmer,** vice president and treasurer, was elected executive vice president and treasurer and appointed chairman of the Finance Committee. **Walter C. Beckjord,** president and chairman of the board for the past 12 years, continues as board chairman of the company.

ERNEST S. FIELDS

Mr. Fields joined the utility in 1914 when he was an electrical engineering student at the University of Cincinnati. His entire business career has been with the company and its subsidiaries. In 1929 he was named manager of the electric department, in 1943 a vice president and two years later a director. Active in the affairs of the American Institute of Electrical Engineers, Mr. Fields has served as the group's vice president and as a member of the board. In 1945-46 Mr. Fields was chairman of the Engineering Division of Edison Electric Institute.

Mr. Zimmer has been with the utilility since 1920 when he joined the treasury department of the old Union Gas & Electric Co. He was elected a vice president in 1946. He has been associated with EEI Accounting Division activities since 1944. He was chairman of the Accounting Division Executive Committee in 1949-50; chairman of the Accounting Division Advisory Committee in 1950-51 and a member of the division's Executive Committee through 1957.

Four new vice presidents have been elected by The Detroit Edison Co. **Arthur S. Griswold,** industry assistant to the president of the company, becomes vice president of industry and public information; **Donald F. Kigar,** manager of the union relations department, vice president of union relations; **Sylvester F. Leahy,** manager of employee relations, vice president of employee relations, and **Chester F. Ogden,** manager of purchases and real estate, vice president of purchases and real estate. Also announced was the appointment of **Marshall Pease** as manager of purchases and real estate for the utility.

Mr. Griswold, active in EEI affairs, has been chairman of the EEI Electric Power Survey Committee since 1954. He has been associated with Detroit Edison since he was graduated from Cornell University in 1922 as a mechanical engineer. He has been active in electric utility industry organization and for several years served as a government consultant on electric power to the Foreign Operations Administration and its predecessor agencies.

Mr. Kigar has been manager of the company's union relations department since its inception in 1953. He joined the company in 1926 after receiving an electrical engineering degree from Ohio Northern University. He has served as manager of construction and assistant manager of purchases.

Mr. Leahy joined the company in 1931, soon after receiving an electrical engineering degree from the University of Michigan. His first position was in the overhead lines department and he was appointed manager of employee relations in 1953.

Mr. Ogden, after receiving a degree in mechanical engineering and business administration from the University of Michigan in 1934, joined Detroit Edison's purchasing department in 1934. He has held the title of manager of purchases and real estate since 1952.

Mr. Pease, former assistant manager of purchases and real estate, started his Detroit Edison career in 1924.

Election of three new vice presidents and retirement of another has been announced by the Utah Power & Light Co. **George R. Corey,** executive vice president and secretary, has retired after 45 years with the company. **D. L. Broussard,** assistant to Mr. Corey, was elected vice president in charge of financing and secretary of the company; **T. C. Woodside,** treasurer, is vice president and retains his duties as treasurer; **P. A. Blanchard,** assistant vice president, becomes vice president in charge of engineering, construction and power production. **J. A. Hale,** who previously was responsible for these assignments will continue as a vice president and serve as general consultant to the company.

Mr. Corey joined the company as an engineer in 1913, a few months after it was founded and made some of the original surveys to determine the capacity of Bear Lake. In 1921 he was graduated from the University of Utah with an LL.B. degree and became assistant attorney for Utah Power & Light. In 1929 he was named general counsel and in 1944 assumed the additional duties of vice president and secretary. When he was elected executive vice president in 1951, he relinquished the assignment of general counsel.

An engineering graduate of Texas A&M University, Mr. Broussard joined the company as an engineer in 1950, after serving with Texas and Utah state highway departments. Mr. Woodside was educated at the Utah State University and joined UP&L as a clerk in 1924. He has served as chief clerk, general auditor and treasurer. Mr. Blanchard is a mechanical engineering graduate of the University of Colorado. Joining the company in 1923, he was a steam-electric station operator, mechanical engineer, chemist, assistant superintendent of steam plants and assistant superintendent before becoming an assistant vice president of Utah P&L.

Harllee Branch, Jr., president of The Southern Co., has been elected vice president and a member of the board of directors of Mississippi Power Co., filling the vacancy created by the recent death of **Eugene A. Yates.** Before his appointment as Southern president early in 1957, Mr. Branch was president of Georgia Power Co., a Southern subsidiary, as is Mississippi Power. A leader in the utility field, Mr. Branch in 1955-56 was president of Edison Electric Institute. He also has been president of Southeastern Electric Exchange.

Five key engineering appointments in its general office staff have been announced by West Penn Power Co.

Carl M. Skooglund, chief electrical engineer, was promoted to coordinator of engineering; **Kenneth N. Reardon,** who had served as assistant relay engineer, design engineer, electrical engineer of switchgear and controls and supervisor of controls engineering, was advanced to chief electrical engineer; **Anthony A. Jedrziewski,** Eastern division engineer, was named project engineer; **William A. Richter, Jr.,** staff engineer-controls, became supervisor of substation engineering; and **Harrell Denmead,** senior engineer-controls, was promoted to supervisor of controls engineering.

Mr. Skooglund, a 36-year veteran of engineering work with West Penn, began his utility career as assistant engineer. He moved up in a series of promotions until he was named chief electrical engineer. He is a graduate of Penn State.

Mr. Reardon has been with the company 34 years and is a graduate of Harvard.

Mr. Jedrziewski, a Penn State graduate, has been serving the company in engineering capacities for 20 years.

Mr. Richter has been an engineer with the utility since 1946. He is a Carnegie Tech graduate.

Mr. Denmead, with West Penn 30 years, was graduated from Virginia Polytechnic Institute.

Frank Reis, commercial sales manager for Pacific Power & Light Co., has been appointed general sales manager with responsibility for system-wide sales activities. He had been acting general sales manager since January when that post was vacated by the promotion of **Roy Vernstrom** to assistant general manager. Mr. Reis joined the company in 1946, following two years of service with the U. S. Navy.

Richard E. Raymond, with Florida Power Corp. since 1939, has been named superintendent of transmission and distribution for the utility. He received his electrical engineering degree from the University of Florida. He also is secretary-treasurer of the American Institute of Electrical Engineers.

CONVENTIONS AND MEETINGS

1958

JANUARY

8 EEI Home Service Committee, Edgewater Beach Hotel, Chicago, Ill.

9-11 2nd Annual LBE National Women's Conference, Edgewater Beach Hotel, Chicago, Ill.

16-17 EEI Industrial Relations Committee, Mayflower Hotel, Washington, D. C.

23-24 Public Utilities Advertising Association Regional Meeting, San Francisco, Calif.

27-29 American Society of Heating & Air Conditioning Annual Meeting, Pittsburgh, Pa.

30-31 EEI Dealer Coordination Committee, EEI Headquarters, New York City

FEBRUARY

3- 5 EEI Prime Movers Committee, Penn-Sheraton Hotel, Pittsburgh, Pa.

3- 6 EEI Industrial Electrification Heating Conference, Netherland Hilton Hotel, Cincinnati, Ohio

6- 7 EEI Industrial Power & Heating Group, Netherland Hilton Hotel, Cincinnati, Ohio

6- 7 EEI-AGA 1958 Conference Final Planning Meeting, Benjamin Franklin Hotel, Philadelphia, Pa.

6- 7 Missouri Valley Authority Industrial & Commercial Sales Conference, President Hotel, Kansas City, Mo.

10-11 EEI Commercial Lighting Committee, New Orleans, La.

10-11 EEI Electrical Equipment Committee, Dayton Biltmore Hotel, Dayton, Ohio

11-12 EEI Transmission & Distribution Committee, Lord Baltimore Hotel, Baltimore, Md.

13-14 EEI Residential Promotion Committee, EEI Headquarters, NYC

17-19 EEI Meter & Service Committee, Sheraton Hotel, Philadelphia, Pa.

20-21 14th Annual National Wiring Promotion Conference, Statler Hotel, Detroit, Mich.

MARCH

6- 7 Pacific Coast Electrical Association Business Development Section, Statler Hotel, Los Angeles, Calif.

13-14 Public Utilities Advertising Association Regional Meeting, Montreal, Canada

1958

20 EEI Industrial Relations Committee, Headquarters, New York City

24-27 EEI 24th Annual Sales Conference, Edgewater Beach Hotel, Chicago, Ill.

27-28 Pacific Coast Electrical Association, Engineering & Operations Section, Sheraton Palace, San Francisco, Calif.

APRIL

14-16 EEI-AGA 1958 National Conference of Electric and Gas Utility Accountants, Shamrock Hilton Hotel, Houston, Texas

16-18 Missouri Valley Authority Engineering Conference, President Hotel & Municipal Auditorium, Kansas City, Mo.

17 EEI Industrial Relations Committee, Headquarters, New York City

23-24 Pacific Coast Electrical Association Administrative Services Section, Hotel Valley Ho, Scottsdale, Ariz.

27-30 EEI Accident Prevention Committee, Commodore Perry Hotel, Toledo, Ohio

28-30 EEI Purchasing and Stores 1958 Annual Meeting, Hotel Nicollet, Minneapolis, Minn.

MAY

5- 7 EEI Prime Movers Committee, Mark Hopkins Hotel, San Francisco, Calif.

8- 9 EEI Transmission and Distribution Committee, Biltmore Hotel, Los Angeles, Calif.

12-13 EEI Electrical Equipment Committee, Radisson Hotel, Minneapolis, Minn.

12-13 EEI Hydraulic Power Committee, Hacienda Motel, Fresno, Calif.

14-16 Pacific Coast Electrical Association Annual Convention, Hotel del Coronado, Coronado, Calif.

15-16 EEI Industrial Relations Committee, Shreveport, La.

JUNE

9-12 EEI 26th Annual Convention, Boston, Mass.

SEPTEMBER

8- 9 EEI-AGA 1958-59 Accounting Division and Section Organization Meeting, Netherland Hilton Hotel, Cincinnati, Ohio

22-24 EEI Meter and Service Committee, Plaza & Driscoll Hotels, Corpus Christi, Texas

Feb. 9-15 National Electrical Week.

EDISON ELECTRIC INSTITUTE OFFICERS AND COMMITTEES

OFFICERS

J. W. McAfee, *President* ..... Union Electric Co., St. Louis, Mo.
J. E. Corette, *Vice President* ..... The Montana Power Co., Butte, Mont.
Edwin Vennard, *Vice President and Managing Director* ..... 420 Lexington Ave., New York, N. Y.
H. S. Sutton, *Treasurer* ..... Consolidated Edison Co. of New York, Inc., New York, N. Y.
A. B. Morgan, *Secretary and Assistant Managing Director* ..... 420 Lexington Ave., New York, N. Y.

BOARD OF DIRECTORS

(*Terms expiring 1958*)

J. L. Bates ..... Central Power and Light Co., Corpus Christi, Texas
A. M. Beebee ..... Rochester Gas and Electric Corp., Rochester, N. Y.
F. D. Campbell ..... Cambridge Electric Light Co., Cambridge, Mass.
C. B. Delafield ..... Consolidated Edison Co. of New York, Inc., New York, N. Y.
R. Roy Dunn ..... Potomac Electric Power Co., Washington, D. C.
R. H. Gerdes ..... Pacific Gas and Electric Co., San Francisco, Calif.
N. B. Gussett ..... Iowa Power and Light Co., Des Moines, Iowa
E. L. Lindseth ..... The Cleveland Electric Illuminating Co., Cleveland, Ohio
D. C. Luce ..... Public Service Electric and Gas Co., Newark, N. J.
M. S. Luthringer ..... Central Illinois Public Service Co., Springfield, Ill.
C. E. Oakes ..... Pennsylvania Power & Light Co., Allentown, Pa.
H. T. Pritchard ..... Indianapolis Power & Light Co., Indianapolis, Ind.
K. M. Robinson ..... The Washington Water Power Co., Spokane, Wash.
L. M. Smith ..... Alabama Power Co., Birmingham, Ala.
Harold Turner ..... American Gas and Electric Service Corp., New York, N. Y.

(*Terms expiring 1959*)

H. J. Cadwell ..... Western Massachusetts Electric Co., Greenfield, Mass.
Stuart Cooper ..... Delaware Power & Light Co., Wilmington, Del.
Carl J. Forsberg ..... Wisconsin Power and Light Co., Madison, Wis.
Allen S. King ..... Northern States Power Co., Minneapolis, Minn.
C. E. Kohlhepp ..... Jersey Central Power & Light Co., Asbury Park, N. J.
C. R. Landrigan ..... The Detroit Edison Co., Detroit, Mich.
J. E. Loiseau ..... Public Service Co. of Colorado, Denver, Colo.
Earle J. Machold ..... Niagara Mohawk Power Corp., Syracuse, N. Y.
D. C. McKee ..... The Empire District Electric Co., Joplin, Mo.
P. H. Powers ..... West Penn Power Co., Greensburg, Pa.
R. G. Rincliffe ..... Philadelphia Electric Co., Philadelphia, Pa.
R. E. Ritchie ..... Arkansas Power & Light Co., Little Rock, Ark.
W. H. Sammis ..... Ohio Edison Co., Akron, Ohio
J. R. Welsh ..... Southwestern Gas and Electric Co., Shreveport, La.
Erwin H. Will ..... Virginia Electric and Power Co., Richmond, Va.

(*Terms expiring 1960*)

W. C. Beckjord ..... The Cincinnati Gas & Electric Co., Cincinnati, Ohio
W. C. Bell ..... The United Illuminating Co., New Haven, Conn.
N. A. Cocke ..... Duke Power Co., Charlotte, N. C.
J. F. Davenport ..... Southern California Edison Co., Los Angeles, Calif.
T. W. Delzell ..... Portland General Electric Co., Portland, Ore.
G. S. Dinwiddie ..... New Orleans Public Service Inc., New Orleans, La.
Willis Gale ..... Commonwealth Edison Co., Chicago, Ill.
M. L. Kapp ..... Interstate Power Co., Dubuque, Iowa
W. T. Lucking ..... Arizona Public Service Co., Phoenix, Ariz.
W. W. Lynch ..... Texas Power & Light Co., Dallas, Texas
L. C. McClurkin ..... Savannah Electric and Power Co., Savannah, Ga.
J. J. McDonough ..... Georgia Power Co., Atlanta, Ga.
A. R. Schiller ..... Public Service Co. of New Hampshire, Manchester, N. H.
G. W. Van Derzee ..... Wisconsin Electric Power Co., Milwaukee, Wis.
J. Theodore Wolfe ..... Baltimore Gas and Electric Co., Baltimore, Md.

Executive Committee

C. B. Delafield, R. R. Dunn, A. S. King, E. L. Lindseth, C. E. Oakes, R. G. Rincliffe
K. M. Robinson, W. H. Sammis, G. W. Van Derzee

EDISON ELECTRIC INSTITUTE OFFICERS AND COMMITTEES

ADVISORY COMMITTEE 1957-1958

D. C. BARNES.....Virginia Electric and Power Co.
A. D. BARNEY.....The Hartford Electric Light Co.
J. B. BLACK.....Pacific Gas and Electric Co.
HARLLEE BRANCH, JR.....The Southern Co.
W. L. CISLER.....The Detroit Edison Co.
C. P. CRANE.....Baltimore Gas and Electric Co.
T. G. DIGNAN.....Boston Edison Co.
EDGAR H. DIXON.....Middle South Utilities, Inc.
PHILIP A. FLEGER.....Duquesne Light Co.
GEORGE M. GADSBY.....Utah Power & Light Co.
D. E. KARN.....Consumers Power Co.
GEORGE L. MACGREGOR.....Texas Utilities Co.
LYLE MCDONALD....Public Service Electric and Gas Co.
PAUL B. MCKEE.....Pacific Power & Light Co.
I. L. MOORE.....New England Electric System
W. C. MULLENDORE.....Southern California Edison Co.
GROVER C. NEFF.....Wisconsin Power and Light Co.
J. S. OSBORNE.....Central & South West Corp.
PHILIP SPORN.....American Gas and Electric Co.
L. V. SUTTON.....Carolina Power & Light Co.
FRANK M. TAIT.....The Dayton Power and Light Co.
J. B. THOMAS.....Texas Electric Service Co.
E. S. THOMPSON....The West Penn Electric Co. (Inc.)
ALLEN VAN WYCK.....Illinois Power Co.

CHAIRMEN OF EDISON ELECTRIC INSTITUTE COMMITTEES (1957-1958)

ACCOUNTING

Accounting Division Executive, J. D. ELLIOTT.....The Detroit Edison Co., Detroit, Mich.
Coordinator of Customer Activities Group, C. J. BERNER.....Wisconsin Electric Power Co., Milwaukee, Wis.
Customer Accounting, M. F. YOUNG.....The Connecticut Light & Power Co., Hartford, Conn.
Customer Collections, J. E. HEVRON.....New Orleans Public Service Inc., New Orleans, La.
Customer Relations, H. R. POTTS.....Columbus and Southern Ohio Electric Co., Columbus, Ohio
Coordinator of General Activities Group, P. R. LAWSON.....Pennsylvania Electric Co., Johnstown, Pa.
Depreciation Accounting, O. E. SMITH.....Baltimore Gas and Electric Co., Baltimore, Md.
General Accounting, G. F. JONES.....Potomac Electric Power Co. Washington, D. C.
Internal Auditing, R. B. TRITTON.....The Cleveland Electric Illuminating Co., Cleveland, Ohio
Plant Accounting and Property Records, G. A. BROWNMILLER.....The Connecticut Light & Power Co., Hartford, Conn.
Taxation Accounting, C. E. YORK.....The Cincinnati Gas & Electric Co., Cincinnati, Ohio
Coordinator of Special Activities Group, C. T. DWIGHT.....The Hartford Electric Light Co., Hartford, Conn.
Accounting Developments Service, A. H. KERN.....Alabama Power Co., Birmingham, Ala.
Accounting Employee Relations, J. J. LEARY.....Boston Edison Co., Boston, Mass.
Application of Accounting Principles, V. A. KOS.....Commonwealth Edison Co., Chicago, Ill.
Electronic Accounting Machine Developments, R. W. BRITT.....Wisconsin Electric Power Co., Milwaukee, Wis.
Uniform System of Accounts, R. G. SCHNEIDER.....Virginia Electric and Power Co., Richmond, Va.

COMMERCIAL

Commercial Division Executive, T. O. MCQUISTON.....Metropolitan Edison Co., Reading, Pa.
Commercial Sales Group, R. I. BULL.....Ohio Power Co., Canton, Ohio
Farm Group, M. O. WHITHED.....Atlantic City Electric Co., Atlantic City, N. J.
Industrial Power & Heating Group, F. E. WIATT.....The Cincinnati Gas & Electric Co., Cincinnati, Ohio
Residential Group, ROBERT L. COE.....Union Electric Co., St. Louis, Mo.
Special Services Group, B. L. PALM.....Central Illinois Public Service Co., Springfield, Ill.

ENGINEERING

Engineering & Operating Division Executive, C. W. FRANKLIN....Consolidated Edison Co. of N. Y., Inc., New York, N. Y.
Electrical System & Equipment, H. E. DEARDORFF.....The Dayton Power and Light Co., Dayton, Ohio
Hydraulic Power, E. S. HARRISON.....Georgia Power Co., Atlanta, Ga.
Meter & Service, FLOYD SALMON.....Central Power and Light Co., Corpus Christi, Texas
Prime Movers, V. L. STONE.....Commonwealth Edison Co., Chicago, Ill.
Transmission & Distribution, W. M. PENNEY.....Union Electric Co., St. Louis, Mo.

GENERAL

General Division Executive, J. W. MCAFEE.....Union Electric Co., St. Louis, Mo.
Accident Prevention, I. R. DOHR.....Consumers Power Co., Jackson, Mich.
Area Development, S. F. MCGOWAN.....Northern States Power Co., Minneapolis, Minn.
Atomic Power, E. L. LINDSETH.....The Cleveland Electric Illuminating Co., Cleveland, Ohio
Awards, M. C. ALBRITTAIN.....Baltimore Gas and Electric Co., Baltimore, Md.
Electric Power Survey, ARTHUR S. GRISWOLD.....The Detroit Edison Co., Detroit, Mich.
Financing & Investor Relations, PAUL HALLINGBY, JR. .....Middle South Utilities, Inc., New York, N. Y.
Industrial Relations, E. J. BRILL.....Pennsylvania Power & Light Co., Allentown, Pa.
Insurance, D. E. WILLIAMS.....The Cleveland Electric Illuminating Co., Cleveland, Ohio
Legal, J. M. KEEGAN.....Consolidated Edison Co. of New York, Inc., New York, N. Y.
Membership, E. S. THOMPSON.....The West Penn Electric Co. (Inc.), New York, N. Y.
Purchasing and Stores, T. S. DUNSTAN.....Consolidated Edison Co. of New York, Inc., New York, N. Y.
Rate Research, L. W. FRANK.....Western Massachusetts Electric Co., Springfield, Mass.
Regulation, C. E. KOHLHEPP.....New Jersey Power & Light Co., Denville, N. J.
Research Projects, E. H. SNYDER.....Public Service Electric and Gas Co., Newark, N. J.
Statistical, A. E. BUSH.....The Detroit Edison Co., Detroit, Mich.
Tax Policy, C. B. MCMANUS.....The Southern Co., Atlanta, Ga.
Technical Assistance for Overseas Visitors, HARVEY BUMGARDNER.....The Detroit Edison Co., Detroit, Mich.
Transportation, R. E. HAMEL.....The Cleveland Electric Illuminating Co., Cleveland, Ohio